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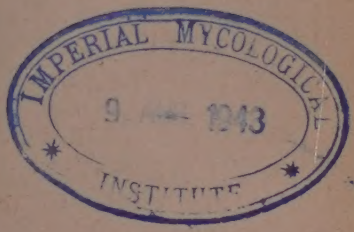

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Bulletins on disease subjects written for farmers and " popular " articles of a similar nature are not included in the *Veterinary Bulletin*. Those of a sufficiently important nature, are, however, included in *Index Veterinarius*; so also are certain review articles, presidential addresses, congress proceedings, etc., where the title conveys as much information as could be given in an abstract of a few lines. For information of this nature, readers of the *Veterinary Bulletin* are referred to *Index Veterinarius*, where titles of all publications indexed by the bureau are fully cross-referenced.

A list of annotations and reviews, classified according to subject, is now given in *Index Veterinarius*, being inserted at the end of each number. Such papers will not necessarily be dealt with in the *Veterinary Bulletin*.

NOTE.—In certain cases it is not possible to check references in the original publication. Such references are marked with an asterisk.

IMPERIAL BUREAU OF ANIMAL HEALTH

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DISEASES CAUSED BY BACTERIA AND FUNGI

—. (1942). Richtlinien für die Diagnostizierung des gelben Galtes der Milchkühe. [**Directions for the Diagnosis of Mastitis (Swiss Milk Commission)**].—*Schweiz. Arch. Tierheilk.* **84.** 248–252. **1815**

A subcommittee of the Swiss Milk Commission invited two veterinarians (STECK and KÄSTLI) to draw up a standard procedure for the laboratory diagnosis of bovine mastitis. The draft recommendation is given here: it is orthodox.—J. E.

MURPHY, J. M. (1942). **Further Observations on the Modified Whiteside Test for the Detection of Chronic Bovine Mastitis.**—*Cornell Vet.* **32.** 439–444. **1816**

In a previous communication [see *V. B.* **11.** 739.], M. described his modification of the Whiteside test, which consists of mixing five drops of fore milk and one drop of N NaOH on a glass plate. Varying degrees of precipitation were found to be closely correlated with the leucocyte content of the milk and thus it was useful as a simple presumptive test for chronic mastitis. In this article, M. describes the modification required to test refrigerated milk. Such milk requires two drops of N NaOH for five drops of milk. The test can be used for composite fore milk and bucket milk, but the dilution of the fore milk in such samples reduces the number of positive reactions.—D. L. HUGHES.

ANDBERG, W. G., & KARLSON, A. G. (1942). **Biopsy of the Bovine Mammary Gland in Connection with Mastitis Studies.**—*Cornell Vet.* **32.** 237–240. **1817**

The authors give a short description of a technique evolved for biopsy of the mammary gland. The instrument used was similar to a cork borer with an outside diameter of 1·52 cm. and 10 cm. in length. To remove tissue, epidural and local anaesthesia was employed. The incisions were made vertically, parallel to the long axis of the teat canal in the middle third of the quarter. The core of tissue was cut out by a rotating movement of the cannula. Haemorrhage was generally slight. Sulphanilamide powder was placed in the wound which was sutured, provision being made for drainage. Healing was usually uneventful.

—D. L. HUGHES.

*HILLERMARK, K. (1941). [*Streptococcus equi* **Infection of the Udder of a Cow**].—*Skand. VetTidskr.* p. 646. [Translation of abst. in *Dtsch. tierärztl. Wschr.* **50.** 150]. **1818**

Two examinations at an interval of 14 days revealed *Str. equi* in a case of mastitis in a cow.—ANN F. RUSSELL.

*VINCENZO, A. (1941). Tentativi di vaccinazione anticarbonchiosa nel coniglio per via endovenosa per la produzione di sieri ad alto valore curativo e precipitante. [**Anthrax: Attempts to Vaccinate Rabbits Intravenously for Production of Curative and Precipitating Serum**].—*Riv. Pat. sper.* **26.** 257–264. [Abst. from abst. in *Jber. Vet.-Med.* **70.** 102]. **1819**

Rabbits were inoculated intravenously with "Pasteur anthrax vaccine", one-tenth of a loopful being given for the first dose; further doses, doubled each time, were given at weekly intervals for 4–5 weeks: immunization with bacilli was then carried on. Mortality due to anthrax was over 70%. The serum of the surviving rabbits had a high curative and protective action in animals, and a high precipitating titre (1 : 5,000). It is intended to use the serum for therapy and possibly for diagnosis of human infections.—J. G. C.

*VACCARI, I. (1941). Un caso di manifestazioni ematogene esantematiche tubercolari (tuberculidi) nel cavallo. [**Exanthematous Manifestation of TB. in a Horse**].—*Nuova Vet.* **19.** 267–282. [Abst. from abst. in *Jber. Vet.-Med.* **69.** 481]. **1820**

A case of skin TB. in a horse is described. The lesions on histological examination did not show typical TB. features. Bovine type tubercle bacilli of very low virulence were isolated, but only after repeated g. pig passage.—A. MOLDAWSKY.

*MÜLLER, M. (1941–42). Das verborgene Vorkommen von Tuberkelbacillen in Fleisch, Blut und normal erscheinenden Organen tuberkulös erkrankter Schlachttiere. [**Hidden Presence of Tubercle Bacilli in Meat, Blood, and Apparently Normal Organs of Tuberculous Slaughter Animals**].—*Dtsch. Schlachth-Ztg.* **41.** 143–146, 229–237, 301–304 & 318–321; **42.** 29–32. [Abst. from abst. in *Jber. Vet.-Med.* **70.** 49]. **1821**

The problem is discussed, and the following conclusions reached from the work of M. and his co-workers. (1) Organs of normal appearance near TB. infections of the reticulo-endothelial system may be infected. (2) TB. infection of lymph nodes does not "result in" infection of the surrounding muscles. (3) The occurrence of tubercle bacilli in the blood does not imply generalized infection or infection of the muscular system, but only involvement of the r.e.s. (4) Blood infection cannot be reliably detected by macroscopic examination, and only heavy infections can be detected bacteriologically.—J. G. CARR.

*—. (1942). Bekämpfung der Rindertuberkulose. RdErl. d. RMdI. v. 3·2·1942—IIIa 3025/42—2190. [**Germany: Circular on Control of Bovine TB.**]—*MinistBl. Minist. Inn. A.* p. 323. [Abst. from abst. in *Jber. Vet.-Med.* **69.** 519]. **1822**

This official notice suspends the voluntary scheme which aimed at the control of TB. by the Ostertag method, and reduces the extent to which slaughter with compensation is carried out, this being limited to open cases in the better quality dairy herds.—A. MOLDAWSKY.

FELDMAN, W. H., & CODE, C. F. (1942). **Tuberculosis in Dogs. With a Report of a Case in which Surgical Procedures may have Influenced the Pathogenesis.**—*J. tech. Meth.* No. 22. pp. 49–55. Discussion p. 56. **1823**

The authors describe TB. in dogs, quote some statistics on its frequency and the type of bacilli found,

and describe a case in a dog used in experimental physiology in which the portal circulation was altered and the liver removed later. On P.M. examination, an apparently primary lesion was found in the small intestine and secondary, perhaps abnormal, miliary lesions in the lungs, heart and kidneys. Human type infection was diagnosed.—J. E.

*Paltrinieri, S. (1941). Contributo alla storia della tubercolosi dei carnivori domestici. Sui primi casi descritti nella letteratura di tubercolosi spontanea del cane a del gatto di origine umana. **[History of TB. in Domestic Carnivores—the First Cases Described of Human Type TB. in Dog and Cat].**—*Nuova Vet.* **19.** 199–206. [Abst. from abst. in *Jber. Vet.-Med.* **70.** 99]. **1824**

P. states that the first case of canine TB. of human origin was described by Brucasco in 1882; the first such case in cats was that described by Bresso in 1883. —J. G. Carr.

*Checcacci, L., Battignani, C., & Rossi, P. (1941). L'infezione sperimentale del gatto da B. tubercolare umano, bovino ed aviario. **[Experimental Infection of Cats with Human, Bovine, and Avian Types of Tubercle Bacilli].**—*Riv. ital. Igiene.* **1.** 729–754. [Abst. from abst. in *Jber. Vet.-Med.* **70.** 98]. **1825**

Cats inoculated by the subcutaneous, intradermal, intramuscular, intraocular, intravenous, or intraperitoneal routes with human type tubercle bacilli showed only a slight loss in weight in the first month, and no lesions developed in the internal organs. Subcutaneous or intraperitoneal inoculation with bovine type bacilli produced a local abscess and enlargement of the regional lymph nodes. After intravenous, intramuscular, intraperitoneal, or intraocular inoculation, typical lung lesions were present after 3–5 months and loss of weight was more pronounced than after subcutaneous inoculation. Subcutaneous, intraocular, or intradermal inoculation of avian type bacilli produced effects only with large inocula, the changes being intermediate between those found with bacilli of the human and bovine types. Two animals inoculated with avian type bacilli showed lung changes, all the others [number not given in abst.] only local reactions. Bovine and avian types of bacilli survived longest in the tissues. The cats infected with the human and bovine type bacilli did not become allergic. Intradermal inoculation of cats can be used to differentiate between the three types of TB.—J. G. Carr.

*Willems, A. E. R. (1940). Tuberculose bij een pauw. **[TB. in a Peacock].**—*Vlaam. Diergeneesk. Tijdschr.* **9.** 273–275. [Abst. from abst. in *Berl. Münch. tierärztl. Wschr.* March 6th. 75. (1942)]. **1826**

A case record of primary tuberculous infection of the throat of a peacock. [Not stated in abst. whether peacock was a domesticated one in Europe or a wild bird in its natural habitat.]

*Contini, V. (1940). Tubercolosi renale sperimentale da bacillo del tipo bovino. **[Experimental Renal Infection in G. Pigs with Bovine Type Tubercle Bacilli].**—*Atti Accad. Fisiocr. Siena.* **8.** 119–137. [Abst. from abst. in *Jber. Vet.-Med.* **69.** 594]. **1827**

The histology is described of the kidney lesions produced in g. pigs by intravenous and intranasal inoculation with human and bovine type tubercle bacilli. —A. Moldawsky.

de Gara, P. F. (1942). **Bovine Tuberculosis. Its Incidence in Bone, Joint and Cervical Lymph Node Lesions in Italy.**—*Amer. Rev. Tuberc.* **45.** 576–585. [Spanish summary]. **1828**

An account is given of 195 cases of extrapulmonary TB. in human beings in northern Italy. Of these, 174 showed bone and joint lesions and 21 had cervical lymph node lesions. Bovine type bacilli were isolated from 13 of the former and from five of the latter. In addition, 13 specimens were obtained from renal and other extrapulmonary lesions. The human type of bacillus was isolated from all of these cases. Including those reported in the published accounts of other workers, a total of 1,117 strains of tubercle bacilli have been classified in Italy. Of these, 54 were of the bovine type (4·8%). The role of infected milk or contact with cattle in these cases of infection with the bovine strain is discussed, but no significant conclusions are drawn.—D. D. Ogilvie.

Beattie, M., & Nicewonger, R. (1942). **Bovine Tubercle Bacilli in Sputum.**—*Amer. Rev. Tuberc.* **45.** 586–588. [Spanish summary]. **1829**

A total of 366 strains of *Mycobacterium tuberculosis* isolated from human sputum samples in California was typed by cultural methods. Thirty-three showing dysgonic growth were injected intravenously into rabbits. None of the rabbits exhibited lesions of bovine TB. and it is concluded that none of the strains was of the bovine type.—D. D. Ogilvie.

*Urbain, A. (1941). L'infection tuberculeuse chez les singes en captivité. **[Tuberculosis in Captive (Zoo) Monkeys].**—*Bull. Acad. Méd. Paris.* **124.** 281. [Abst. from abst. in *Bull. Inst. Pasteur.* **40.** 74]. **1830**

A total of 330 cases of TB. was recognized in anthropoid apes, gibbons, and monkeys in captivity. In 60% of the cases lesions were generalized, in 25% they were localized in the intestinal tract, and in the remaining 15% lesions were found in various other organs. Of 40 strains of *Mycobacterium tuberculosis* isolated from the monkeys, 34 were of the human type, five of the bovine type, and one of the avian type. —Isobel W. Burton.

Schroeder, C. R. (1938). **A Diagnostic Test for the Recognition of Tuberculosis in Primates; a Preliminary Report.**—*Zoologica, N.Y.* **23.** 397–400. **1831**

A diagnostic tuberculin test for use in primates is described, the recommended procedure being the injection of 0·1 ml. of a 1% PPD tuberculin into the subcutaneous tissue at the margin of the upper eyelid. The reaction in positive cases is held to be readable from outside the animal's cage between 16 and 72 hours after injection, and takes the form of an oedematous swelling and reddening of the eyelid with, on rare occasions, a small area of necrosis.—J. L. McGirr.

Bogen, E. (1942). **Tuberculin Tests in Guinea Pigs with Purified Protein Derivative.**—*Proc. Soc. exp. Biol., N.Y.* **51.** 221–222. **1832**

This preliminary report outlines the results of comparative g. pig tests with a sample of Seibert's new PPD preparation [Seibert & Glenn—*V. B.* **12.** 216.] and a commercial Old Tuberculin. B. concludes that, in tuberculous g. pigs, O.T. is more sensitive, more specific, less antigenic, and less often lethal than PPD. [The quantitative aspects of the experimental procedure described appear to be open to criticism.]—J. L. McG.

Puder, S. (1942). **The Dermato-Pulmonary Reaction. IV. Effect of Tuberculin Reaction upon the Lung.** —*Amer. Rev. Tuberc.* **45.** 446–449. [Spanish summary]. **1833**

This report concerns the effect of a tuberculin reaction on the subjacent lung, following intracutaneous inoculation of Old Tuberculin on the right side of the chest of the rabbit. Gross and microscopic changes,

such as scattered haemorrhages under the pleura and in the lung tissue, and oedema and emphysema of various degrees were found in the right lung of both normergic and allergic animals, with similar but less extensive changes in the left lung.—Isobel W. Burton.

Pottenger, F. M. (1942). **Immunity in Tuberculosis. Clinical Considerations.** — *Amer. Rev. Tuberc.* **45.** 651–659. [Spanish summary]. **1834**

In a general discussion of immunity to TB. in human beings, P. deplores the tendency to dissociate allergy and immunity. In his opinion, allergy is an intimate part of the total immunity reaction which is essential to healing. Healing, in turn, especially in advanced or advancing cases of disease, is a combination of immunity and compensation.

The position of tuberculin as a therapeutic agent is open to question. Contrary to the general opinion, P. finds it of value in acute exudative cases in which it appears to aid absorption and stimulate fibrosis.

—D. D. Ogilvie.

Moore, M. (1942). **The Chorioallantoic Membrane of Chick Embryos and its Response to Inoculation with some Mycobacteria.**—*Amer. J. Path.* **18.** 827–847. **1835**

Several series of chick embryos 12–13 days old were infected with virulent strains of human, bovine, or avian type tubercle bacilli, or with mycobacteria from fishes and snakes, or with rat leprosy bacilli, by implantation of a loopful or 0·1–1·0 mg. of bacilli on the ectodermal surface of the chorioallantoic membrane. After incubation for 5–6 days, a histological examination was made of sections of the membranes stained for acid-fast organisms and for tissue changes. Mass implantation of the bacilli gave best results and the type and intensity of the reaction produced in the membrane enabled a relatively early estimation of virulence. The application of a similar technique to the study of the action of drugs or chemical fractions of the bacilli as inhibitory or propagative agents is suggested.—R. O. Muir.

Biester, H. E., Schwarte, L. H., & Packer, R. A. (1942). **Studies of Sheep, with the Demonstration of Pasteurella Localized in the Central Nervous System.** —*Amer. J. vet. Res.* **3.** 268–273. **1836**

This is an account of a small outbreak in a flock of sheep. The affected animals showed nervous symptoms. The histopathology consisted of degenerative changes in the brain tissue accompanied by polymorphonuclear and monocytic infiltrations. Meningitis was also present.

Brain material from affected sheep did not yield cultures, but small laboratory animals inoculated with it became infected and *Pasteurella multocida*, group II of Rosenbusch & Merchant [*V. B.* **9.** 682.], was isolated from their brain, heart blood, and liver.

—M. H. Kyaw.

Cernăianu, C. (1942). Ueber die Geflügelcholera, eine durch Haltung, Ernährung und Ausbeutung bedingte Krankheit. **[Fowl Cholera, a Disease Influenced by Management, Diet, and Sale Traffic].** —*Z. InfektKr. Haustiere.* **58.** 142–159. **1837**

A review of the nature of fowl cholera, based on many years' research in Rumania. *Pasteurella aviseptica* has a very widespread distribution and commonly resides in the respiratory mucous membranes of ordinarily healthy fowls. Some birds carry a chronic infection, residual from a previous infection, *e.g.* wattle disease. The organism varies greatly in virulence, being most virulent from birds dead of peracute F.C.

In Rumania, fowls usually suffer from vitamin A deficiency during the winter and often also from over-exposure to the weather. The former condition manifests itself by degeneration of the mucous membranes and it is then that the pasteurella are able to penetrate and to cause clinical F.C. The disease does not appear in well kept and well fed fowls. Control is therefore directed towards good management.—J. E.

Evans, W. M., & Sawyer, J. E. (1942). **Bovine Abortion Apparently due to Listeria Infection.**— *Cornell Vet.* **32.** 448–449. **1838**

This is an account of the recovery of listerella from an aborted foetus. The dam belonged to a herd which had been certified as Bang's disease free for many years.

The authors suggest that in the course of routine laboratory examination for *Brucella abortus*, the presence of listerella organisms may frequently have been overlooked.—M. H. Kyaw.

Julianelle, L. A., & Moore, E. (1942). **Pathological Changes in Listerella Infection, Particularly of the Eye.**—*Amer. J. Path.* **18.** 813–825. **1839**

A description is given of the histopathology of lesions produced in the spleen, lymph nodes, liver, and lungs of rabbits, g. pigs, and mice following intravenous or intraperitoneal injection of graded doses of *Listerella monocytogenes*. A histological study of omental, inguinal, and axillary lymph nodes removed from rabbits at different stages of infection did not reveal any structural modification observed by some authors in human infectious mononucleosis.

The clinical course of the ophthalmic reaction, together with associated anatomical and histological changes in ocular and periocular structures is also described in rabbits, g. pigs, and monkeys in which ophthalmic infection was induced by conjunctival instillation or intraconjunctival injection of several drops of 18–24 hour listerella broth cultures.—R. O. Muir.

*Lasserre, R., Velu, H., & Soulié, P. (1941). Rôle possible du " Bacillus proteus " dans la funiculite de castration chez le cheval. **[Role of *Proteus vulgaris* in Funiculitis following Castration in Horses].**— *Bull. Acad. vet., Fr.* **14.** 83–86. [Abst. from abst. in *Bull. Inst. Pasteur.* **40.** 252]. **1840**

Streptococci and *P. vulgaris* were isolated from a post-castration funiculitis lesion in a horse. The serum of the horse agglutinated the particular strain of *P. vulgaris* at a titre of 1 : 1,000 as compared with titres of 1 : 200 exhibited with *Proteus* OX_{19} and OXK strains.

*Carpano, M. (1941). La diarrea paracolibacillare dei pulcini e dei tacchinotto in Albania. **[Paracoli Infection in Chicks and Turkey Poults in Albania].** —*Riv. milit. Med. vet., Roma.* **4.** 283–296. [Abst. from abst. in *Jber. Vet.-Med.* **70.** 117]. **1841**

A disease of chicks and turkey poults, on the whole similar to pullorum infection in epidemiology, symptoms, and pathological changes, was encountered in Albania. The organism responsible resembled *Salmonella pullorum* in all respects except that it clotted milk. It is therefore considered to be of the paracolon group.

—J. G. Carr.

Bornstein, S., Saphra, I., & Daniels, J. B. (1941). **The Occurrence of Salmonella Antigens in Dysentery Bacilli.**—*J. Immunol.* **42.** 401–404. [Authors' summary copied *verbatim*]. **1842**

Salmonella antigens were identified in *Shigella* strains. It can be stated that mutual antigens occur in the *Salmonella*, *Escherichia-Aerobacter* and *Shigella* groups; in other words, within the whole genus *Bacterium*. The presence of the VI, XIII complex in Hiss-Y strains should be remembered in the performance of agglutinative tests for diagnostic purposes.

CASTANEDA, M. R., TOVAR, R., & VELEZ, R. (1942). **Studies on Brucellosis in Mexico. Comparative Study of Various Diagnostic Tests and Classification of the Isolated Bacteria.**—*J. infect. Dis.* **70.** 97–102. [Authors' summary copied *verbatim*]. **1843**

From a study of 200 patients suffering from brucellosis we found that blood cultures may be positive in as high as 84% of attempts, as compared with 93% of positive agglutination tests and 80 and 60% respectively for the allergic and opsonic tests. About 10% of the cases in the year 1940 were found to give negative serologic and allergic tests while brucella were isolated from the blood.

The classification of 150 strains of brucella showed that 143 were Br. melitensis, 5 Br. abortus and 2 Br. suis.

The prevalence in Mexico of Br. melitensis was corroborated by epidemiologic data pointing to the consumption of dairy products from goats as a main source of infection.

BONYNGE, C. W. (1942). **Calfhood Vaccination in a Brucellosis Control Program in Certified Dairies.**—*J. Amer. vet. med. Ass.* **101.** 120–123. **1844**

For about ten years from 1927, bovine brucellosis in the Los Angeles district was controlled by test and segregation. Three of the herds under supervision were very large ones. In spite of short-interval testing and precautionary measures, this method did not prove successful, and severe breakdowns occurred. Purchase of new animals was fraught with danger and home-bred heifers had proved to be especially hazardous as replacements. In 1939, calfhood vaccination with strain 19 was begun in a herd of about 1,000 animals. During 1939 reactors averaged 0·37% and in 1940, 0·28%. In 1941, three out of eight tests were negative and the average for the year was 0·1% positive. Whey agglutination tests of 168 milk samples were all negative. Other large dairies have also begun vaccination. It may yet be possible to secure dairy herds having a definite immunity to brucellosis, but final judgment should be made after a long period of trial.—S. J. GILBERT.

*MILUNOVIĆ, M. (1941). **[Brucellosis of Dogs in Croatia].**—*Vet. Arhiv.* **11.** 305–320. [German summary]. [Abst. from abst. in *Wien. tierärztl. Mschr.* **29.** 379]. **1845**

About 300 dogs were tested by the agglutination and complement-fixation methods, 260 being apparently healthy country dogs taken at random and the rest various dogs including veterinary school clinic patients. Nine of the former and two patients reacted positively (aggln. titre 1 : 80, c.f. by 0·1 ml. serum). The results of both tests agreed very closely.

*SELMI, G. (1941). L'infezione brucellare nei conigli selvatici. **[Brucella Infection in Wild Rabbits].**—*Riv. ital. Igiene.* **1.** 1083–1102. [Abst. from abst. in *Jber. Vet.-Med.* **70.** 106]. **1846**

Of 35 wild rabbits captured in the Royal Game Preserves of S. Rossore, Italy, five males and two females gave positive agglutination reactions, with titres of 1 : 80–1 : 450.—J. G. CARR.

PLASTRIDGE, W. N., & WILLIAMS, L. F. (1943). **Observations on Vibrio Foetus Infection in Cattle.**—*J. Amer. vet. med. Ass.* **102.** 89–95. **1847**

A review of the disease as reported by other workers is followed by the authors' own observations. A satisfactory culture medium was soft agar (liver infusion, with 1% peptone and 0·3% agar, pH 7·4), incubation being at 37°C. in 10% CO_2; growth appeared in 24 hours as a narrow band about 1 mm. thick 0·5–1 cm. below the surface, while in 3–5 days there was a dense grey zone 2–4 mm. wide just below the surface. *V. foetus* grew in the above medium with the following sugars added, but without acid production :– arabinose, glucose, dextrin, dulcitol, galactose, inulin, lactose, laevulose, maltose, mannitol, raffinose, salicin, sucrose, sorbitol, or trehalose. The organism killed 12-day chick embryos within five days, and grew in the allantoic fluid.

Antigen for agglutination tests was prepared by growth in the soft agar medium for ten days at 37°C. in 10% CO_2, followed by formalinization and fractional centrifugation. In detecting the occurrence of vibrionic abortion, microscopic and cultural examination of foetal material should be supplemented by aggln. tests with the dam's serum; in seven cases tested, the agglutination titre varied from 1 : 25 to 1 : 800.

The agglutination titres of cattle in 12 brucellosis-free herds were studied : in six herds there was evidence of vibrionic abortion, while the other six were regarded as free; the results indicated that titres of 1 : 50 or less should be regarded as negative, positive agglutination at 1 : 100 and partial at 1 : 200 as suspicious, and titres of 1 : 200 or over as positive. Positive reactions were commoner in older animals. The course of infection was followed in two herds, and it was noted that agglutination titres of 1 : 100 or more were of short duration, and that a relatively high incidence of reactors might or might not be accompanied by a high abortion rate.

The conclusions drawn are :– that the agglutination test is of value in diagnosing abortions due to *V. foetus*, and in detecting the probable presence of infection in a herd of cattle; that abortions usually occur during the fourth, fifth, or sixth months of pregnancy, and that infection tends to be self-limiting, due to the transitory nature of the infection, and to a tendency for initial infection to increase resistance to subsequent exposure. —E. COTCHIN.

*CANNAVÒ, F. (1941). Reperti ematologici nella terapia della linfangite criptococcica. **[Blood Picture during Treatment of Epizootic Lymphangitis].**—*Profilassi.* **14.** 12–16. [Abst. from abst. in *Jber. Vet.-Med.* **69.** 473]. **1848**

Affected horses generally show leucopenia, lymphocytosis, slight acceleration in the erythrocyte sedimentation rate, and deviation of the neutrophile count towards the left. In animals treated with corrosive sublimate and with milk injections, there was at first erythropenia and leucopenia and later a return to normal values or erythrocytosis and leucocytosis; the lymphocyte count showed increase of neutrophiles and eosinophiles, decrease of monocytes and lymphocytes, and a shift to the left in the Arneth count. The sedimentation rate of the erythrocytes is greatly increased. —A. MOLDAWSKY.

SEVAG, M. G., & SHELBURNE, M. (1942). **Cyanide-Sensitive Bacterial Respiratory Systems Different from the Usual Cytochrome-Cytochrome Oxidase System.**—*J. gen. Physiol.* **26.** 1–9. **1849**

In order to determine which enzyme systems are inhibited by the sulphonamide drugs, the nature was investigated of the catalysts associated with the respiratory functions of *Streptococcus pyogenes* and *Pneumococcus* type I. Aerobic respiration of these organisms was strongly inhibited by KCN, NaN_3 and Na_2S; the anaerobic glycolysis of glucose by pneumococcus was also inhibited by KCN and NaN_3. These and other results indicate that *Str. pyogenes* and *Pneumococcus* type I contain cyanide-sensitive respiratory systems which are different from the cytochrome *c* + cytochrome oxidase system.—R. ALLCROFT.

MUDD, S., POLEVITZKY, K., ANDERSON, T. F., & KAST, C. C. (1942). **Bacterial Morphology as Shown by**

the Electron Microscope. III. Cell-Wall and Protoplasm in a Strain of Fusobacterium.—*J. Bact.* **44.** 361–366. [For previous parts see *V. B.* **12.** 558]. 1850

MUDD, S., POLEVITZKY, K., & ANDERSON, T. F. (1942). **Bacterial Morphology as Shown by the Electron Microscope. IV. Structural Differentiation within the Bacterial Protoplasm.**—*Arch. Path.* **34.** 199–207. 1851

III. The photomicrographs reproduced in this article appear to provide conclusive evidence that the bacterium was surrounded by a definite cell wall enclosing fluid protoplasm, in which areas of greater and lesser density could be detected. Previous studies were therefore confirmed.

IV. Further photomicrographs of the *Fusobacterium* and of *Salmonella typhi* show the presence of a cell wall and ill defined dense areas. Discrete dense spheroidal or discoidal granules are shown in cells from the genera *Mycobacterium*, *Corynebacterium*, *Vibrio* and *Spirochaeta*. The human type tubercle bacilli examined appeared to have very delicate cell walls.—J. FRANCIS.

See also abstr. **1997** (mastitis), **1893** (summer mastitis, brucellosis), **1940** (brucella), **2022** (salmonella), **1999-2002**, **2023-2027** (TB.), **1878** (haemophilus), **1889** (clostridium), **2003** (chemotherapy), **1895** (bacterial invasiveness), **1993**, **1994** (antibacterial agents), **2004**, **2005** (" calf diphtheria "), **2006** (ringworm), **2036** (text-book).

DISEASES CAUSED BY PROTOZOAN PARASITES

JANSEN, G. R. (1942). Notas sôbre o comportamento do " Trypanosoma equinum " em animais de laboratório. **[Behaviour of *T. equinum* in Laboratory Animals].**—*Rev. brasil. Biol.* **2.** 247–253. 1852

J. inoculated *T. equinum* into dogs, g. pigs, mice, rats, hamsters, opossums, pigeons, and a cock, using the subcutaneous, ocular (conjunctival sac), oral, peritoneal, vaginal, and cutaneous routes.

Infection failed through the intact skin or vaginal mucosa, but was successful through the buccal mucosa and the conjunctival sac. Two animals bore young during the experiments but intra-uterine infection was not noted. Faeces from *Triatoma* which had fed on infected animals were not infective when injected into experimental animals, but when tissue material from infected ticks was used, transmission was successful. Two pigeons, the cock, and a hamster resisted infection, as well as one out of two opossums.—MILLER WATSON.

COLLIER, H. O. J., FULTON, J. D., & INNES, J. R. M. (1942). **The Oedema of Mice Infected with *Trypanosoma cruzi*, and the Accompanying Pathological Lesions.**—*Ann. trop. Med. Parasit.* **36.** 137–150. 1853

Most mice infected with *T. cruzi* show progressively (a) a negative blood phase, (b) a period when patent infection begins and slowly increases in severity, (c) a phase when acute pathological changes may occur in the animal, and (d) a chronic state when patent blood infection fades, may relapse, or may disappear altogether. During stage (c) a swelling of the body develops in most mice. There is a subcutaneous swelling which irons out the natural folds of the skin and is particularly marked in the back, neck, abdomen, and axillae.

The appearance of the swelling was observed to coincide with a great gain in body weight which fell again as the swelling subsided. The anatomical and histopathological findings are given in detail, and summarized as :– generalized subcutaneous oedema; generalized lymphadenopathy; acute diffuse myocarditis; occasionally endocarditis and valvulitis; focal hepatitis; acute myositis; periphlebitis of the great veins; passive congestion with moderate enlargement of the spleen.

The absence of changes in the thyroid excludes the oedematous condition from myxoedema. This oedematous condition does not occur in *T. gambiense* and *T. congolense* infections of mice, nor in *T. cruzi* infections of other laboratory animals, but does occur in *T. cruzi* infections of man and dogs, the hosts to which the parasites are truly pathogenic.

The relationship between the pathological conditions in Chagas' disease and in other forms of trypanosomiasis is discussed, and it is considered that except for the extreme degree and regularity with which oedema occurs, the general picture is similar in any chronic trypanosomiasis.—U. F. RICHARDSON.

KERR, W. R. (1943). **Trichomoniasis in the Cow.**—*Vet. J.* **99.** 95–106 & 145–151. 1854

The principal symptoms of bovine trichomoniasis are recapitulated as those of vaginitis, endometritis, pyometra, and anoestrus, and it is pointed out that a lesion which may be predominant in one locality may be rare in another. Diagnosis should be based on the history, on direct examination, and on the agglutination test, though the latter gives positive results in only about 60% of cases, and must be regarded merely as a herd test. One uterine injection with a 1 : 400 or 1 : 600 solution of iodine is considered to be sufficient to free the genitalia of cows from trichomonads, and 3½–5 oz. of fluid is considered a safe quantity to inject. The use of volsella forceps and care in the introduction of the catheter through the os uteri are recommended.

Fifteen heifers were experimentally infected by the use of trichomonad cultures or service by an artificially infected bull; some of these animals carried their calves to full term, whilst others failed to conceive or aborted and exhibited the various symptoms of the disease. Several heifers either failed to develop infection or only harboured trichomonads for a few days. Four controls served by an uninfected bull calved normally as also did a heifer which was treated by intramuscular injections of trichomonads, in an attempt at immunization. —U. F. RICHARDSON.

PAVLOV, P. (1942). Coccidienbefunde bei Säugetieren und Vögeln in Bulgarien. **[Coccidia Found in Mammals and Birds in Bulgaria].**—*Zbl. Bakt. I.* (*Orig.*). **149.** 317–319. 1855

P. lists 26 species of coccidia found in mammals and birds in Bulgaria. Coccidiosis is most commonly found, as elsewhere, in young chickens and rabbits. It is believed that the disease also occurs in lambs in Bulgaria.—C. HORTON SMITH.

HONESS, R. F. (1942). **Coccidia Infesting the Rocky Mountain Bighorn Sheep in Wyoming with Descriptions of Two New Species.**—*Bull. Wyo. agric. Exp. Sta.* No. 249. pp. 28. 1856

For this investigation, faeces were obtained from numerous animals in various localities in Wyoming, and although the method used does not give accurate information on incidence and multiple infection, H. believes that the collections have been wide enough to give a complete picture of the coccidia infesting bighorn sheep in Wyoming. The report is divided into two parts corresponding to the classification adopted by CHRISTENSEN [*V. B* **9.** 696.], *i.e.* a consideration of (1) those species in which the oocysts carry a polar cap, and (2) those in which the polar cap is absent; in regard to this feature, Christensen's proviso that oocysts normally possessing polar caps not infrequently lose them, is admitted. Details of dimensions of oocysts

are given. It is fortunate that many of the sheep-inhabiting coccidia give rise to oocysts with fairly definite morphological features which can be used with some certainty in species determination, so that size is only an important additional aid to correct identification. There are roughly two groups of oocysts with polar caps, *viz*, large oocysts, like those of *E. intricata*, and small oocysts like those of *E. arloingi*, the latter being those usually associated with acute coccidiosis in sheep. There is a wide range in the dimensions of the smaller oocysts, but whether these differences result from variation in the species *E. arloingi* or whether they point to a group of species wrongly assumed to be one species is an open question which, from the practical point of view, is probably irrelevant. A new species of the small polar-capped group has been named *E.ah-sa-ta* [the specific name is derived from the Indian name, *Ahsahta*, for bighorn sheep]. It is also found in the domestic sheep and according to H. can be recognized by observation of the oocyst alone, despite the fact that there are large strains of *E. arloingi* which resemble it. It was seen, however, in pure infections. Another new species, *E. crandallis*, is also described in bighorn sheep.

Among the oocysts without a polar cap there is less confusion. *E. faurei* is the largest species of the group and can be identified by its morphology alone. Descriptions of *E. ninae-kohl-yakimovi* and *E. parva* are also given. With the possible exception of *E. crandallis*, the species of coccidia infecting bighorn sheep are identical with those of domestic sheep although the size range in the bighorn is somewhat greater. The pathogenicity of several species is established for the domestic sheep, but nothing is yet known of the pathogenicity of any species for the bighorn sheep. The identity of the species was determined by dimensions and morphological characters alone and no cross-infection experiments were carried out.—C. HORTON SMITH.

HUFF, C. G. (1942). **Schizogony and Gametocyte Development in Leucocytozoon simondi, and Comparisons with Plasmodium and Haemoproteus.**—*J. infect. Dis.* **71.** 18–32. **1857**

Schizogony and gametogony have been studied in smears and tissues from domestic ducks and semi-domesticated mallards with natural infections of *L. simondi*. Suspected young schizonts were found in the macrophages of the liver and spleen as well as extracellularly in these organs. Two types were recognized, the hepatic schizonts occurring in hepatic cells without causing their distortion, and megaloschizonts occurring in the blood vessels of, or extravascularly in, the heart, spleen, liver, and intestine. Series of stages in development have been seen. Assumed young gametocytes were observed in the lymphocytes, monocytes, myelocytes, and late polychromatophile erythroblasts, but it was only in lymphocytes and transitional stages to monocytes that a graded series of developmental stages was observed. Ducks which survived an epizootic of *Leucocytozoon* disease showed decreasing numbers of gametocytes in the blood until April of the following year, when there was a simultaneous appearance of young stages of *Leucocytozoon* and *Haemoproteus*.

The parallel relationships existing between the genera *Plasmodium*, *Leucocytozoon* and *Haemoproteus* and their respective invertebrate hosts supply the principal evidence in support of the dipterous origin of the malarial parasite. Protozoologists have grouped *Leucocytozoon* and *Haemoproteus* in the family Haemoproteidae and *Plasmodium* in the Plasmodidae. The insect vectors of *Plasmodium* and *Leucocytozoon* belong to the dipterous suborder Orthorrhapha while that of *Haemoproteus* is a member of the Cyclorrhapha. These differences between genera and hosts are serious obstacles to a clear appreciation of the true relationships and it is possible that the taxonomy is at fault and that *Leucocytozoon* approximates more closely to *Plasmodium* than to *Haemoproteus*, or that our knowledge of the possible vectors themselves is too meagre to make accurate comparisons. H. shows that all three genera are more nearly related than was commonly supposed, but he produces no evidence to clarify the relative positions of the three genera to one another. Greater knowledge of the life-cycles is wanted. He noted the simultaneous occurrence in a flock of ducks of *Haemoproteus* and *Leucocytozoon*, and, as hippoboscid flies are rare on ducks, it is just possible that the nematoceran *Simulium*, in addition to the pupiparan hippoboscids, may serve as vector of *Haemoproteus*. If this should prove to be so it would appear that all three genera evolved with the orthorrhaphous Diptera but that hippoboscids, in virtue of their close association with birds, became later adapted for the transmission of *Haemoproteus*.—C. HORTON SMITH.

*CORRADETTI, A. (1941). Ricerche sulla patologia dell'infezione da Plasmodium gallinaceum nei polli inoculati con sangue infetto. [**Pathology of *Plasmodium gallinaceum* Infection in Fowls Inoculated with Infected Blood**].—*Riv. Parassit.* **5.** 141–154. [Abst. from abst. in *Jber. Vet.-Med.* **69.** 621]. **1858**

Two cycles, the endo-erythrocytic and endo-histiocytic, occur in the development of *P. gallinaceum* in the fowl. Two phases can be traced in the endo-erythrocytic cycle, the first usually lasting 11 days and the second for a prolonged period, possibly until the animal dies. C. claims that the invasion of the histiocytes by the parasite indicates an inefficient development of the immunization process in the infected animal. He regards the endo-erythrocytic period as that of equilibrium between parasite and host.—C. H. S.

*ROETTI, C. (1941). Le piroplasmosi bovine nello Scioa e nel Gimma. [**Bovine Piroplasmosis in Shoa and Jimma (Abyssinia)**].—*Nuovo Ercol.* **46.** 105–115. [Abst. from abst. in *Jber. Vet.-Med.* **69.** 288]. **1859**

Babesia bigemina, *Theileria parva*, and *Anaplasma marginale* infections occur. *Boophilus decoloratus*, *Rhipicephalus evertsi*, *R. appendiculatus* and *R. simus* are stated to be the vectors in these areas. A noteworthy fact is that in the native zebus the disease runs a very benign course; clinical cases are rare and the mortality is very low.—M. LANDAU.

JOHNSON, D. W. (1942). **Leptospirosis in Australia.**—*Proc. 6th Pacific Sci. Congr., 1939.* **5.** 331–336. **1860**

Four serologically distinct strains of leptospira have been isolated in Australia, *viz L. icterohaemorrhagiae*, *L. australis* A, *L. australis* B, and *L. pomona*. The known distribution of leptospirosis is confined to the state of Queensland. To date about 150 human cases have occurred, including 40 cases of *L. pomona* infection. The principal occupational types affected have been sugar-cane cutters, dairy farmers, abattoir employees, and sewer workers. *L. icterohaemorrhagiae* is carried by imported sewer rats, and the *L. australis* strains by native rats. The native carrier of *L. pomona* has not yet been discovered, but the infection appears to be endemic in pigs in south Queensland. It is suggested that calves may also carry infection. The disease in sugar-cane cutters is ascribed to infection in rats which attack the sugar cane. It is thought that water is essential in the transference of the disease from animal to man.—U. F. RICHARDSON.

ESSEVELD, H. (1942). **Leptospirosis in the Netherlands Indies, with special reference to the Virus Reservoirs.**

—*Proc. 6th Pacific Sci. Congr., 1939.* **5.** 321–329. **1861**

An investigation into leptospiral infections of rodents and cats in the neighbourhood of Batavia was made by the inoculation of liquid media with pieces of kidney cortex. It appeared that 16·7% of field rats harboured *L. javanica*, and 50% of sewer rats showed leptospiral infection, the predominant organism being *L. bataviae*. From serum reactions with cat sera, it is considered that one-third of these animals weighing over 2 kg. had previously been infected with *L. bataviae*, and over a quarter with *L. javanica*. Probably cats become infected when hunting rats, but they may also play a part in spreading the pathogenic agent. It is pointed out that *L. canicola* infection in dogs has been recorded in western Java, and *L. hebdomadis* infection in dogs in Sumatra.—U. F. RICHARDSON.

•BIANCHI, C. (1941). L'isolamento delle leptospire per filtrazione "in vivo". **[Isolation of Leptospira by Filtration *in vivo*].**—*Profilassi.* **14.** 73–76. [Abst. from abst. in *Jber. Vet.-Med.* **69.** 603]. **1862**

SCHÜFFNER'S [*V. B.* **11.** 220.] method for purification of cultures of various strains of *L. icterohaemorrhagiae*, some of which were artificially contaminated by *Bacterium coli* and various cocci, was used on 30 g. pigs. B. found that the contaminating organisms could be cultured from the heart blood, and concludes that the method cannot replace that of cultivation *in vitro*.—A. MOLDAWSKY.

See also absts. **2008**, **2009** (trypanosomes), **2010** (avian coccidiosis), **2030** (isolation of protozoa), **2007** (chemotherapy).

DISEASES CAUSED BY VIRUSES AND RICKETTSIA

RAWLINS, T. E. (1942). **Recent Evidence Regarding the Nature of Viruses.**—*Science.* **96.** 425–426. **1863**

Since STANLEY reported his investigations many, but not all, workers have believed that certain viruses are protein macro-molecules that may multiply in their hosts by a process of autocatalysis. If each virus particle were a macro-molecule, it would be expected that all the particles of a given virus should have the same size and form. Electron micrographs of viruses having spheroidal particles, have indicated a certain amount of uniformity in the size and form of the particles of a given virus. Viruses, however, having rod-shaped particles, although showing a marked uniformity in width, have shown great variations in length. The length of the particles of rib-grass strain of tobacco mosaic virus were measured on the electron microscope and a frequency curve of the lengths prepared. The virus particles were of various lengths and the longer lengths did not appear to be multiples of the most characteristic length. This was taken to indicate that the virus particles did not consist of macro-molecules placed end to end, but in several respects they more nearly resembled rod-shaped bacteria which are very uniform in width but vary greatly in length. —JOHN FRANCIS.

HAVENS, W. P., JR., WATSON, D. W., GREEN, R. H., LAVIN, G. I., & SMADEL, J. E. (1943). **Complement Fixation with the Neurotropic Viruses.**—*J. exp. Med.* **77.** 139–153. **1864**

Brain tissue from hamsters and mice infected with St. Louis and Japanese encephalitis and Western and Eastern encephalomyelitis, and with the West Nile virus was used as a source of antigen. Saline containing 1% of homologous inactivated serum was used as a diluent and 10% brain suspensions were prepared. High-speed centrifugation was employed to remove both anti-complementary material and substances giving non-specific reactions. Potent infectious antigens were obtained which could be inactivated by irradiation with ultra-violet light without much loss in complement-fixing titre. The methods of producing complement-fixing antibodies against the different viruses are described in detail. Both the inactivated antigens and the complement-fixing sera deteriorated rather rapidly when stored at 0°–5°C., but the keeping qualities of these substances dried from the frozen state are being investigated. Cross-reactions were demonstrated with materials from animals infected with the viruses of Eastern and Western equine encephalomyelitis, but no relationship was detectable between the St. Louis, Japanese, and West Nile viruses. These findings are different from those obtained with neutralization and cross-immunity tests and demonstrate the need for further study.—JOHN FRANCIS.

ANDERSON, K. (1942). **Dual Virus Infection of Single Cells.**—*Amer. J. Path.* **18.** 577–583. **1865**

Chick embryos were infected concurrently with the following pairs of viruses taken from previously inoculated embryos :– fowl-pox and herpes, fowl-pox and laryngotracheitis, fowl-pox and vaccinia, herpes and vaccinia, and rabies and herpes. The dual infections became established, not only in separate tissues of the embryos, but also in single cells in which the distinct types of inclusion body developed. The inclusion body picture is illustrated in photomicrographs.—J. E.

SIMMONS, J. S. (1942). **The Insect Transmission of Neurotropic Viruses.**—*Proc. 6th Pacific Sci. Congr., 1939.* **5.** 181–189. **1866**

A brief summary of some points relating, among others, to louping ill and equine encephalomyelitis. No new material.

KOEFOED, H. (1942). Undersøgelser over hvilken brintionkoncentration, der er den gunstigste for opbevaring af mund- og klovesygevaccinen gennem laengere tid. **[Research on the Optimum pH Value for the Conservation of Foot and Mouth Disease Vaccine over Long Periods].**—*Skand. VetTidskr.* **32.** 800–808. [In Danish : English summary]. **1867**

Several tests were carried out. (1) Virus in solutions buffered to pH values of 7, 7·5, 8, and 8·5 was kept at + 2°C. for 39 days. Viability and titration tests done at intervals within that period showed that the virus survived best at pH 7·5 and next best at pH 7. (2) Virus kept in the same way after adsorption on $Al(OH)_3$ kept best, though not very well, at pH 6·7–7·0. (3) Adsorbed virus kept at 37°C. remained viable longest at pH 7. (4) Vaccination trials were carried out on g. pigs with adsorbate vaccine adjusted to various pH values and then incubated for 72 hours at 37°C. The highest degree of immunity was conferred by vaccines of pH 7·6, 8, and 8·6. Similar vaccines stored for 2½ months were most effective when they had been prepared at pH 7·6 and 8. After 3½ months' storage the batch at pH 7·6 was most effective. (5) The best adsorption is achieved by the use of pure $Al(OH)_3$, but such adsorbate has a pH of about 7·0, which is slightly low for the optimum keeping quality. The use of NaOH solution to raise the pH figure to the all-round optimum of about 7·5 hinders adsorption to a small extent, so that more $Al(OH)_3$ is required for full adsorption. The use of glycine buffer to raise the pH was even more detrimental to adsorption and is not recommended.

—J. E.

O'Flaherty, F., & Doherty, E. E. (1939). **Foot-and-Mouth Disease. I. A Problem of International Concern. II. A Method for Sterilizing Skins and Hides against the Virus of Foot-and-Mouth Disease.**—*J. Amer. Leath. Chem. Ass.* **34.** 325–336. **1868**

I. A summarized description of F. & M. disease.

II. In response to requests to find by test a reliable disinfectant for hides contaminated by F. & M. disease virus the authors, working for the Foundation Farmers' Council, carried out experiments with g. pigs infected with vesicular stomatitis virus. Infected pad skin was removed and subjected to tube tests simulating conditions under which hides can be handled. Sodium hydrogen fluoride and sodium bisulphate at various strengths were used and it was found that the former at 1 : 10,000 is the most reliable and suitable disinfectant, provided that the proportion of hide to disinfectant solution is 1 : 4, that the hides are left in it for 24 hours at 20°–25°C., and that the pH be adjusted to 6·2–6·5. [The authors presumably assumed that these results with vesicular stomatitis virus will also be valid with F. & M. disease virus.]—J. E.

Dlugosz, H. (1943). **Foot-and-Mouth Disease in Man.**—*Brit. med. J.* Feb. 13th. 189–190. **1869**

Clinical symptoms suggestive of F. & M. disease were observed in two men. It is stated that g. pigs inoculated with the virus fluid from the soles and palms of one case developed the typical signs and symptoms of F. & M. disease after 12–14 days. In a short discussion the importance of recognizing the disease in man, in order to prevent spread to animals is emphasized. [These two cases described may have been F. & M. disease, but it is extremely rare for a g. pig to develop F. & M. disease as long as 12 days after inoculation. The examination of convalescent sera for the presence of protective antibodies would have confirmed or refuted the diagnosis.]—John Francis.

Underbjerg, G. K. L. (1943). **Aujeszky's Disease. Outbreak on an Iowa Farm.**—*Vet. Student, Iowa.* **5.** 114–115 & 144–146. **1870**

A description is given of Aujeszky's disease affecting seven cattle on one farm in Iowa. Infection was probably acquired from pigs running with the cattle. The interval between onset of symptoms and death ranged from 14–20 hours. Diagnosis was confirmed by subcutaneous and intravenous inoculation of brain suspensions into rabbits.—E. Cotchin.

Bang, F. B. (1942). **Experimental Infection of the Chick Embryo with the Virus of Pseudorabies.**—*J. exp. Med.* **76.** 263–270. **1871**

Four strains of Aujeszky's disease virus inoculated on the chorio-allantoic membrane of developing chick embryos produced, besides the previously described membrane lesions, marked destruction of the central nervous system of the embryo. Two "fixed" strains which had undergone at least 50 cerebral passages in rabbits produced haemorrhagic lesions due to actual invasion by the virus of the vascular endothelium, but two other strains, even after eight rabbit passages, did not invade the vascular endothelium. The lesions are described in detail.—E. Cotchin.

*Virga, E. (1941). Ricerche su un virus rabbico di strada notevolmente rinforzato. [**Research on a Remarkably Virulent Strain of Street Rabies Virus**]. —*G. Batt. Immun.* **26.** 447–458. [Abst. from abst. in *Jber. Vet.-Med.* **70.** 42]. **1872**

A strain of the virus isolated from a cat in Palermo killed a subdurally inoculated rabbit in six days, and further passage in a dog produced the disease in ten days, the animal dying in 14 days. Negri bodies were demonstrated. Two g. pigs inoculated with the saliva of this dog developed symptoms in eight and ten days respectively.—J. G. Carr.

Kligler, I. J., & Bernkopf, H. (1943). **The Path of Dissemination of Rabies Virus in the Body of Normal and Immunized Mice.**—*Brit. J. exp. Path.* **24.** 15–21. **1873**

Experiments were made on mice to determine the localization sites and route of dissemination, of rabies virus following infection in normal and immunized animals. After intraperitoneal injection of rabid brain emulsion into normal mice, the virus was demonstrable during the first six hours in peritoneal washings, the liver, spleen, mesentery, and the axillary and inguinal lymph nodes. After 24 hours, no virus was found in any of the organs, but after 72 hours, the virus was found in the cervical cord, apparently reaching there by some predilection nerve route from the peritoneal cavity. The virus spread in the next 24 hours to other parts of the central nervous system and evidence of centrifugal spread was found later.

After subcutaneous injection into normal mice, there was no general lymphatic distribution in the body; the virus was demonstrable after four hours, but not after 24 hours, in the muscles at the site of injection and occasionally in the regional lymph nodes. After 72 hours, the virus was found in the spinal cord: if the site of injection was in the fore-limb, it was found in the cervical cord, if in the hind-limb, in the lumbar and thoracic cord. Spread then occurred to the rest of the c.n.s., and centrifugally to the various body lymph glands, and even to the site of injection. In immunized mice, the virus disappeared more rapidly from the site of injection, the rate of disappearance varying with the degree of immunity: if spread did occur, the virus reached the various parts of the c.n.s. as quickly as in normal mice, immunity apparently depending on rapid destruction of the virus during the first hours after infection.—E. Cotchin.

Quiroga, S. S., & Estoup, J. (1942). La lucha contra la rabia paralítica de los bovinos en la Argentina. [**Control of Paralytic Rabies in Cattle in the Argentine**].—*Rev. Med. vet., B. Aires.* **24.** 544–555. [Also appeared in *Bol. tec. Direcc. gen. Agric. Ganad., B. Aires*, Sec. Ganad. No. 7. pp. 407–418. (1942)]. **1874**

The authors give the history of paralytic rabies in cattle in the Argentine and describe the control measures taken. The method of preparing the chloroform brain tissue vaccine is given in detail. In 1941, 446,200 ml. of vaccine were manufactured and 73,630 cattle were inoculated. The figures for total production in ml., bovines immunized and equines immunized are as follows:– 1931—21,320, 1,922, 178; 1932—380,695, 3,640, 224; 1933—1,860,630, 160,384, 5,976; 1934—916,670, 97,215, 3,640; 1935—1,269,910, 102,480, 3,891; 1936—661,980, 59,847, 1,780; 1937—506,680, 57,240, 1,865; 1938—470,740, 45,916, 992; 1939—473,000, 46,210, 580; 1940—626,720, 64,884, 540; 1941—446,200, 73,630, 90. The incidence of the disease is now greatly reduced.—Miller Watson.

Villagomez, S. (1942). El problema epizootológico de la encefalo mielitis enzoótica o derriengue. [**Epizoology of Bovine Encephalomyelitis** (*Derriengue*)]. —*Rev. Med. vet., B. Aires.* **24.** 531–535. **1875**

In this preliminary note, V. describes the symptoms of bovine encephalomyelitis (*derriengue*) in Mexico. Although the disease was first noted in bovines, it has now been found to affect horses, pigs, and dogs. It is apparently a virus infection and V. believes that it is identical with, or very similar to, paralytic rabies found

in other parts of America. He will publish further work on the subject in the near future. [The name *derriengue* is used in Mexico for a disease, probably rabies, in horses and cattle and has also been applied to the poisoning of cattle in Dominica by *Zamia* plants—see *V. B.* **9.** 792, **11.** 521, and **12.** 393.—Ed.]—M. W.

GREEN, R. H., & PARKER, R. F. (1942). **The Effect of Separate Inoculation of Serum and Virus upon the Protection-Test in Vaccinia.**—*J. Immunol.* **45.** 171–177. **1876**

The evidence concerning the value of immune serum administered after the inoculation of virus is conflicting. SABIN concluded that susceptible tissue was capable of adsorbing or fixing both virus and protective substance. When virus was fixed first, the subsequent adsorption of protective substance was without effect; when the protective substance was fixed first, virus was without effect.

In careful experiments, the authors showed that infiltration of the rabbit skin with specific serum conferred protection against infection with active vaccine virus subsequently inoculated. The protection was specific and diminished regularly with time. Infiltration of the skin with immune serum after virus had been inoculated also protected against infection; the degree of protection diminished regularly as the interval between introduction of virus and immune serum increased.—JOHN FRANCIS.

OLIPHANT, J. W., & PERRIN, T. L. (1942). **The Histopathology of Type B (Lee strain) Influenza in Mice.**—*Publ. Hlth Rep., Wash.* **57.** 809–814. **1877**

Groups of young mice were inoculated intranasally with type B influenza virus, alone or in combination with type A or type B antisera. The inflammatory reactions in the trachea, bronchi, and lungs were essentially similar, in the first two groups, to those following the inoculation of type A virus. There is, therefore, no cross-immunity between the two types. Type B virus combined with type B antiserum gave rise to a few small lung lesions in seven of 29 mice inoculated. The changes did not resemble those produced by the virus alone. The results indicated almost complete neutralization of virus by antiserum.—I. W. B.

BANG, F. B. (1943). **Synergistic Action of Hemophilus influenzae suis and the Swine Influenza Virus on the Chick Embryo.**—*J. exp. Med.* **77.** 7–20. **1878**

The synergistic action of swine influenza virus and *H. influenzae-suis* has been clearly demonstrated in pigs and a similar relationship probably exists between the influenza virus and *H. influenzae* in man, but this synergism cannot be demonstrated in the ferret or other experimental animals.

Chick embryos 9–10 days old were inoculated with *H. influenzae-suis*, swine influenza virus, and a combination of the two. A clear cut synergistic action was demonstrated and the essential pathological features of the swine disease were reproduced in the embryo. When human, instead of swine influenza virus was used the synergistic effect was not produced. There was little difference between the actions of recently isolated and old stock strains of *H. influenzae-suis* and even heat-killed cultures produced almost the same effect.—J. F.

I. ANDERSON, K., & GOODPASTURE, E. W. (1942). **Infection of Newborn Syrian Hamsters with the Virus of Mare Abortion (Dimock and Edwards).**—*Amer. J. Path.* **18.** 555–561. **1879**

II. GOODPASTURE, E. W., & ANDERSON, K. (1942). **Virus Infection of Human Fetal Membranes Grafted on the Chorioallantois of Chick Embryos.**—*Ibid.* 563–575. **1880**

III. DIMOCK, W. W., EDWARDS, P. R., & BRUNER, D. W. (1942). **Equine Virus Abortion.**—*Bull. Ky agric. Exp. Sta.* No. 426. pp. 20. **1881**

IV. DIMOCK, W. W. (1940). **The Diagnosis of Virus Abortion in Mares.**—*J. Amer. vet. med. Ass.* **96.** 665–666. **1882**

V. SÁLYI, J. (1942). Beitrag zur Pathohistologie des Virusabortus der Stuten. [**Histopathology of Virus Abortion in Mares**].—*Arch. wiss. prakt. Tierheilk.* **77.** 244–253. **1883**

I. Frozen liver tissue from aborted equine foetuses was received from DIMOCK and attempts were made to infect pregnant and newborn mice and g. pigs with the infective agent it was suspected to contain, but results were negative. Similarly, pregnant hamsters inoculated intraperitoneally with 0·5 ml. of a 1 : 10 suspension of ground liver did not abort but produced normal young. It was, however, possible to infect hamsters 1–4 days old with the same material in doses of 0·1 ml. intraperitoneally, as indicated by the development in their livers and hearts of focal necrosis associated microscopically with intranuclear inclusions resembling those of infected foals. This histological finding was in this work taken as the sole evidence of the existence of an infective agent capable of giving rise to inclusion bodies, and no evidence of its possible filtrability was sought. The infective agent was passaged twice in series by means of liver suspension in hamsters before it died out. The inclusions are shown in photomicrographs.

II. This work was done with the primary object of studying the potential pathogenicity for man of certain viruses not at present known to occur in man, by testing the susceptibility of human embryonic tissue in tissue culture. In this work a new method was developed—the growing of human amnion and chorion by grafting on the chorio-allantois of fowl embryos. The technique is detailed. Various viruses were propagated on such grafts, *viz*, herpes, vaccinia, and variola, and the positive results are recorded and illustrated. In addition, the agent of equine abortion [above] was so grown after having failed to grow directly on avian chorio-allantois. Using emulsified foal liver (unfiltered) a minority of about four dozen amniotic grafts were infected as judged by the appearance of inclusion bodies in the nuclei of the epithelial cells. Chorion never became infected. This result is taken to indicate the possible susceptibility of man to virus abortion of mares and the insusceptibility of fowls.

III. This is a statement of about 20 years' observations on what the authors believe is a type of infectious abortion in mares caused by a filtrable virus. Nineteen outbreaks in Kentucky have been investigated. No evidence of bacterial infection could be found. The foetuses, aborted between the 8th and 10th month by mares otherwise in normal health, showed characteristic lesions, *viz*, carcasses jaundiced, abdominal distension, congestion of the liver, with punctiform surface necrosis, thoracic contents yellowish with excess of pleural fluid, and ecchymoses on the lungs and heart. The amnion was oedematous and straw coloured.

Microscopically, the chief finding was inclusion bodies in the liver and lungs. These are illustrated [poorly] in photomicrographs and in coloured drawings. In studies of the suspected infective agent, mice, rabbits and g. pigs were injected by various routes with suspensions of tissues from aborted foals, but no causative agent was demonstrable. Attempts to cause abortion in g. pigs had no significant results. Five out of 24 pregnant mares aborted after varied " treatments " with supposedly infective material, both filtered or unfiltered, and the aborted foetuses showed typical lesions. Unsuccessful attempts were made to cultivate a " virus " on egg embryos. Serum and vaccine experiments are

also reported, the latter with the object of preventing abortion in pregnant mares.

IV. D. gives the distinguishing features of the disease and 13 points of value for differential diagnosis. (1) Epizootic character; (2) symptomless abortion; (3) placenta rarely retained; (4) aborting mares not ill; (5) prompt involution of uterus; (6) characteristic lesions of foetus; (7) foetuses bacteriologically negative; (8) blood of mares does not agglutinate *Salmonella abortus-equi*; (9) mares immunized against *S. abortus-equi* may abort; (10) mares may abort after natural exposure and experimental infection with material from aborted foetuses; (11) convalescent serum seems to have immunizing value; (12) histopathology of the foetal liver characteristic; (13) occurrence of intranuclear inclusion bodies. In addition to those points mentioned in III above, it is here stated that abortion has been observed in a mare placed in a box recently vacated by an aborting mare and that "infection was carried to the stall of a pregnant mare by an attendant who helped to handle aborted foetuses". D. concludes that in natural conditions of outbreaks, sufficient mares become affected to indicate that the disease is infectious. GOODPASTURE is quoted as stating that the inclusion bodies are "typically viral in nature".

V. S. examined histologically tissues from 12 aborted foals in Hungary, the liver, spleen and lungs in each case, the heart and kidneys in ten, and the gastro-intestinal tract, lymph nodes, brain, and allantochorion in a few cases.

In the liver were found focal necrosis with cell inclusions in the nuclei of dying cells, pulmonary oedema, localized bronchitis with nuclear inclusions in necrotic cells, focal necrosis in the spleen and no characteristic change in the other organs. Nuclear inclusions occurred in 12 of the foetuses, being most common in the liver. They are held to indicate a specific infection, probably by a filtrable virus.

In a supplementary paragraph, S. reports the finding of cell inclusions in a few foals which died a few days after birth at full term. In those surviving for over three days, the specific changes described above are said to have disappeared, giving place to suppurative inflammation.

[These papers present the case made by the authors that the disease of Kentucky is caused by a filtrable virus, yet the experiments with filtered material have not been very convincing. The claim that inclusion bodies indicate that a filtrable virus operates appears to require further investigation. SÁLYI's paper brings the European disease into line with the American.]

—J. E.

*MANNINGER, R., & CSONTOS, J. (1941). Aetiologie des seuchenhaften Verwerfens der Stuten. **[Aetiology of Infectious Abortion in Mares in Hungary].**—*Állatorv. Lapok.* **69.** 161–165. [Abst. from abst. in *Berl. Münch. tierärztl. Wschr.* August 15th. 401. (1941)]. **1884**

In Hungary so-called "virus abortion" is rather common. It is not considered as a specific infection but merely as a sequel to influenza. Convalescent serum may be beneficial.

LOWE, H. J. (1942). **Rinderpest in Tanganyika Territory.**—*Emp. J. exp. Agric.* **10.** 189–202. **1885**

An interesting and detailed account of the great rinderpest epizootic which swept through Tanganyika in 1938 and the succeeding years, and of the control measures adopted. Since the ruinous and devastating epizootic which spread to the Cape at the end of the last century, rinderpest has not appeared in territories south of Tanganyika and veterinary policy in the latter Territory has been concentrated on prevention of southward extension of the disease. The veterinary department had, in 1933, succeeded in pushing rinderpest northward until active disease was present only in two small areas on the Kenya border. Retrenchment in the depression years led, however, to a modified policy and the depleted staff was unable to prevent the extension of the disease which, by 1938, had spread southward to the foothills of the Iringa Escarpment. From this time onwards the story is one of co-operative effort between the East African and South African territories, funds and staff being quickly provided for an extensive campaign for the suppression of the disease. In 1938, serum-virus inoculations were given to 51,800 head of cattle in a belt between the Iringa Escarpment and the Ruaha river. Vaccination of 97,200 head with three injections at intervals in a belt to the south of this was also effected; this gave a fairly solid immunity for about 15 months. Vaccine was prepared in a field laboratory; mortality from both operations was negligible. The immune belt thus created was, however, outflanked, the disease being carried through the fly-belt to the east and west by game. At a conference in January 1940 it was decided (1) that vaccination, with three injections given at intervals, should be carried out in all cattle in southern Tanganyika from the Rhodesia-Nyasaland-Tanganyika border to the 1938 vaccinated belt (vaccine-virus was actually used in some districts); (ii) that the cattle in the 1938 belt and all cattle north of it up to the Central Railway should be reimmunized, and (iii) that an intensive intelligence system in both cattle and game areas should be maintained. In a little over seven months this programme was completed; it involved the immunization of nearly one million cattle, and 4,000 were slaughtered for vaccine production in the field. The undertaking was a remarkable feat of organization and entailed zealous work by both the field and laboratory staff. In October 1940, the Colonial Development and Welfare Fund provided a grant of £32,000 p.a. for two years for reinoculation work and maintenance of an intelligence service.

Apart from spasmodic mortality in greater kudu, south-west of Kilwa, the rinderpest position in general was very encouraging during the earlier part of 1941. This game outbreak disappeared, but in June 1941 rinderpest reappeared in calves in a herd near Lake Rukwa and outbreaks in game in the same area caused anxiety. The countries to the south were warned and a further conference was called. As a result the construction of a game-proof fence was commenced between the southern end of Lake Tanganyika and the north of Lake Nyasa, a distance of 220 miles. The fence was of miombo timber 10 ft. high, held in position by wire struts every 6 ft. Cost was estimated at £30 per mile. By January 1942, about 100 miles had been completed. It was proposed to exterminate game for 25 miles on each side of the fence by systematic shooting and the fence was to be patrolled by armed guards who would repair any break-through. In the meantime, 200,000 head of cattle in the border areas (triple vaccinated in 1940) were inoculated with Kenya attenuated goat virus, while 60,000 head on the Rhodesia-Nyasaland side were revaccinated.

The appearance of rinderpest in the Lake Rukwa area was mysterious; the possibility of a "carrier" of the virus amongst the wild fauna is suggested. At the end of 1941 the disease had been pushed 100 miles north of the Central Railway and the Eastern, Central, Western, and Tanga provinces had been cleared together with most of the Northern Province. 1,740,291 inoculations with Kenya attenuated goat virus were given in 1941. The infection in game, however, on the

western side of Lake Rukwa remained and constituted a serious threat to Northern Rhodesia. In that area greater kudu, buffalo, eland, topi, and reedbuck were infected.

L. remarks that all the extensions of rinderpest in southern Tanganyika since 1938 had been caused by game and that if it were not for the game problem rinderpest could probably be eradicated from Tanganyika and the position maintained if similar measures were carried out in the territories to the north and west. Control measures since 1938 had cost £125,000.

—H. E. Harbour.

Stader, O., & Slaughenhaupt, R. R. (1942). **Distemperoid Virus as an Immunizing Agent Against Canine Distemper.**—*N. Amer. Vet.* **23.** 782–784 & 790. **1886**

"Distemperoid" virus is stated to be that used by Green [*V. B.* **11.** 687]. This is a biologically modified live dog distemper virus obtained by passaging 50–60 times through ferrets; it is non-virulent for dogs. A vaccine consisting of virus so treated is now marketed commercially. It is stated that as prepared and packed, the virus maintains its viability for months. Over half a million foxes have been immunized as well as several thousand dogs.

Details are given of a trial of the vaccine in four large groups of dogs given the virus at varied dosage. Reactions appear to have been greater to the small than to the larger doses. Some of the dogs were exposed to natural infection and a few contracted distemper. It is concluded that the use of this modified virus does not cause distemper and if given in doses of 15 ml. the reactions are slight and the immunity produced appears to be of long duration.—J. A. Griffiths.

Hummon, O. J., & Bushnell, F. R. (1943). **Tissue Vaccine in the Control of Mink Distemper.**—*J. Amer. vet. med. Ass.* **102.** 102–105. **1887**

The preparation and application of a formalinized tissue vaccine during the course of an outbreak of distemper on a mink farm are described. The outbreak was checked about a fortnight after vaccination ended. The method was promising, and more tests are urged to determine the value of tissue vaccine in controlling mink distemper.—E. Cotchin.

See also absts. **1979** (equine infectious anaemia), **1936** (fowl sarcoma), **1916–1925** (virus in cancer), **1951** (bovine epithelial cell inclusions), **2028** (virus titration on chorioallantois).

IMMUNITY

Grabar, P., & Dervichian, D. (1942). Rapports quantitatifs entre antigènes et anticorps dans les précipitations spécifiques en relation avec la structure moléculaire. **[Quantitative Relationship Between Antibody and Antigen in Specific Precipitations with Relation to the Molecular Structure].**—*Ann. Inst. Pasteur.* **68.** 74–79. **1888**

A theory of antigen-antibody reactions is developed based on the assumption of a particular type of model representing the protein molecule [see Dervichian (1940–41). *C. R. Acad. Sci.* **211.** 792, and **212.** 86]. This is pictured as a flat, hexagonal disc of constant thickness with a diameter varying according to molecular weight. The two disc faces are assumed to be identical in respect of the arrangement, nature and number of the free polar amino acid groups which project from them, and the combination of a certain number of these polar elements is held to constitute one unit of valency; this unit, according to the theory, is repeated three times on each face of the protein disc.

Formulae are derived representing the type of complex precipitate formed by the interaction of antigen and antibody in concentrations ranging from large excess of antigen to large excess of antibody. Thus, when a small amount of antigen (G) is added to excess of antibody (A), only the G molecules can satisfy all their valencies and each disc face will unite with three A molecules; the resultant compound is represented by the formula A_6G. If, however, it is assumed that molecules of G can become affixed to the exterior faces of A_6G the compound will be represented by the formula $(A_3G)_nA_3$. On the other hand excess of G in increasing amounts will produce the compounds $(A_3G)_nG$, A_3G_2, and, eventually, in presence of large excess of G, AG_6. That these formulae are compatible with quantitative experimental findings is shown by a number of examples derived from results published by several authors. Diagrammatic illustrations of the compounds represented in the above formulae are given in the text.—J. L. McG.

Koerber, W. L., & Alture-Werber, E. (1942). **In Vitro Titration of Horse Sera Containing Both Vibrion Septique and Perfringens Antitoxin.**—*J. Immunol.* **45.** 223–228. **1889**

The increasing importance of gas gangrene infections has made it desirable that rapid and reliable *in vitro* tests should be available for the separate estimation of either *Clostridium septicum* or *Cl. welchii* antitoxins in the presence of both.

For determination of *Cl. septicum* antitoxin, a technique is described in which the oxygen-stable α toxin is estimated, horse red blood corpuscles being used as an indicator. *Cl. welchii* antitoxin was estimated by a modification of the egg-yolk reaction [see Macfarlane *et al.*—*V. B.* **11.** 461]. These tests gave reliable results which corresponded with those obtained by the *in vivo* titration of the antitoxins.—John Francis.

Pressman, D., Campbell, D. H., & Pauling, L. (1942). **Complement Fixation with Simple Substances Containing Two or More Haptenic Groups.**—*Proc. nat. Acad. Sci.* **28.** 77–79. **1890**

The relationship was investigated of complement to the precipitates which form when simple compounds containing two or more haptenic groups are added to haptene-homologous antisera. The experimental results indicated that complement was removed from solution during the precipitation of a multihaptenic simple substance by its haptene-homologous antiserum, the implication being that antigen need not necessarily be of protein or other complex nature for the fixation of complement. On the other hand, haptene-antibody combination to form a soluble complex with no precipitation, did not fix complement under the conditions investigated.—J. Lochiel McGirr.

Burnet, F. M., Freeman, M., Jackson, A. V., & Lush, D. (1941). **The Production of Antibodies. A Review and a Theoretical Discussion.**—*Monogr. Walter & Eliza Hall Inst., Melbourne.* No. 1. pp. 76. London & Melbourne: Macmillan & Co. Ltd. [4to] [8s. 6d.] **1891**

The authors have written this monograph from the viewpoint that much of the past knowledge of immunology has been conditioned by strictly practical aims in medical or veterinary science, and that attention should now be directed to general biological problems concerning the relation of protein synthesis in the living cell to the concept of biological modifications as an integral part of antibody production. It is generally accepted that the specific activity of immune serum results from modifications on the surface of the globulin

molecule which alters its capacity to react with antigens. Recent work on the serum proteins, including ultra-centrifugation and electrophoretic and refined salting-out methods, has suggested that specific antibodies are homodisperse molecules, but that there may be wide variations in molecular weight ranging from 1,000,000 to 150,000 or less. From available evidence, antibody molecules correspond physically to one or other type of globulin molecule found in normal serum. If this is the case, the antibody globulin moiety of the plasma can be used as a mobile store of protein for tissue needs. Certain experimental studies support this contention, but this evidence does not exclude the possibility that fixation of antibody to cells is primarily an immunological reaction which permits tissues to respond rapidly to local infections.

The differences between primary and secondary responses to an injected antigen are discussed with special reference to staphylococcal toxoid which produces practically no antibody to a primary intravenous injection, although a sharp response follows a second inoculation ; subcutaneous injections, on the other hand, produce a slow primary response. The increase after a second intravenous injection appears to follow a strictly logarithmic course.

With bacteria, rickettsia, and bacteriophage, this sharp division between primary and secondary response is not usually encountered. With bacteria, differences become striking only when very small doses of antigen are used, whilst there is a longer duration of circulating antibody after the secondary inoculations. Pure suspensions of rickettsia form excellent antigens provoking an early primary response similar to that given by bacterial vaccines as judged by agglutination. With bacteriophage, the time of appearance and character of the secondary response correspond closely with those produced by toxins, but there is a difference that the antibody to the primary stimulus arises within four days and may be maintained for at least two months. B. considers that the form of curve obtained with staphylococcal toxoid shows that the rate of antibody production is proportional to the amount of serum antibody, a strong indication that there is multiplication of some entity concerned with antibody formation.

Theories relating to the development and destruction of antibody and quantitative changes in its production, are developed at some length.

After discussing the literature on the probable site of antibody production, the authors state that the lymph nodes may play an important role. In influenza in mice, more antibody was detected in the mediastinal l.nn. than in the bloodstream, whilst none was found in the lungs. Also, after infection of the cornea of the rabbit with herpes virus, a significant antibody rise was detected in the adjacent l.nn., but not in the blood serum. This early formation of l.n. antibody does not occur with staphylococcal toxoid. No evidence of antibody production at the site of local injections of antigen, *e.g.* skin, was found.

The final section which deals with the theoretical aspect of antibody production, does not lend itself to abstraction and should be read in the original.

—R. E. GLOVER.

—. (1943). **Discussion on Active Immunity. I.—General Considerations.** [Speakers : FLEMING, A., GLENNY, A. T., & HARTLEY, P.]—*Proc. R. Soc. Med.* **36**. 145–149. **1892**

—. (1943). **Discussion on Immunity. II.—Bacterial Vaccines and Toxoids.** [Speakers : DOWNIE, A. W., PARISH, H. J., LOVELL, R., & GILBERT, S. J.]—*Ibid.* 149–154. **1893**

I. FLEMING pointed out that whilst immunization with live vaccines might be successful in the mass, occasionally disease was produced in the individual. For this reason, he was in agreement with the refusal of authorities in Great Britain to sanction inoculation of man with vaccines containing living organisms. He considered that properly prepared, dead vaccines administered in appropriate doses could be as effective as living vaccines. Evidence was advanced that demonstrable antibodies, such as agglutinins and bactericidal substances, might develop within a few hours of the inoculation of a vaccine. The combination of specific immunization with chemotherapy, to which F. has contributed many valuable observations, was discussed in relation to infection of mice with pneumococci. These experiments indicated that immunotherapy and chemotherapy can be combined with considerable advantages.

GLENNY discussed the principles of primary and secondary stimulus in relation to active immunity. He suggested that a small dose of antigen might act as a primary stimulus on only a limited number of cells ; if too few cells were so trained, the second dose of antigen might operate mostly on untrained cells and thus act as a primary stimulus. Figures were given showing the response of g. pigs to small doses of diphtheria toxoid of varying quality.

HARTLEY pointed out that the difficulty of preparing dry, stable preparations and of devising precise methods of biological assay had hindered the elaboration of methods for determining the potency of antigens. To illustrate this point, experiments conducted at the National Institute of Medical Research, London, and by workers in other countries to establish a standard method for the assay of diphtheria formol toxoid, were described. The results of g. pig tests, undertaken independently at three different laboratories, showed a significant variation in the response. These differences were due partly to freedom from disease of the g. pigs used by the London workers and partly to the composition of the rations. The effect of diet was studied in two groups of g. pigs kept under identical conditions, except that one received mangolds and the other cabbage in the diet. In the former there was only a feeble response to the injection of diphtheria antigen, whereas a high degree of immunity developed in the latter. The variations resulting from change in diet and from tests undertaken at different times of the year emphasized the need for carrying out assays of potency in strict comparison with a standard preparation.

II. DOWNIE described the results obtained with toxoids and bacterial vaccines in the prevention of certain diseases of man, pointing out that large-scale immunization was likely to be practised only against those infections liable to epidemic spread, where there was a risk of high mortality. The diseases mentioned were diphtheria, tetanus, typhoid, dysentery, cerebro-spinal meningitis, pneumococcal pneumonia, and whooping cough.

PARISH discussed certain technical details in the preparation of vaccines, toxoids etc. The importance of using suitable strains and the effect of different preservatives were stressed. It was pointed out that the process of killing may harm a vaccine, as certain antigens are heat labile and many antiseptics denature protein. The size and the spacing of doses were discussed.

LOVELL drew attention to the outstanding differences between human and veterinary medicine. Greater risks were justifiable with animals than with man, since the economic aspect was of prime importance and the individual animal was subordinate to the herd or flock. The value of live vaccines in the control of anthrax,

swine erysipelas, and other diseases was stressed and figures were given showing the degree of protection which was afforded and the proportion of deaths directly attributable to vaccination. Variations in the susceptibility and ease of immunization of different animals were discussed and examples of the fluctuation in the duration of immunity were given. In particular, reference was made to attempts to protect cattle against summer mastitis by *Corynebacterium pyogenes* toxoid. Serological tests indicated a rapid rise in antitoxic value, especially after an intravenous injection, but the antibody content dropped very quickly.

GILBERT gave a preliminary report on the immunization of goats and cattle against *Brucella abortus* by means of vaccines prepared from dead organisms incorporated in lanolin and liquid paraffin. Good results were obtained in the tests on goats. In cattle, of nine animals vaccinated each with about 10^{12} organisms and subsequently tested by the conjunctival route, there were eight full-time calves and one premature birth; four of the animals showed some evidence of infection. All of the three controls aborted and were heavily infected. It is admitted that large and unsightly local reactions were often produced by the vaccine.

—R. E. GLOVER.

*LUDÁNY, G., JÁSZBERÉNYI, J., & ZSIRAY, K. (1940). **[Action of Reduced Air Pressure on Phagocytosing Power of Serum].**—*Mag. orv. Arch.* **61.** 523–527. [Abst. from abst. in *Berl. Münch. tierärztl. Wschr.* Nov. 28th. 586. (1941)]. **1894**

The opsonic power of serum was increased in rabbits after their exposure in caissons to low pressures equal to altitudes of 3,500–4,000 metres. As reduced pressure has a sympathicotonic effect, it is considered that this observation indicates that the normal immune bodies are under sympathetic control.

DURAN-REYNALS, F. (1942). **Tissue Permeability and the Spreading Factors in Infection. A Contribution to the Host: Parasite Problem.**—*Bact. Rev.* **6.** 197–252. **1895**

This comprehensive review is concerned mainly with questions relating to the permeability of the intercellular "ground substances" of simple and specialized connective tissues. The implications in relation to the phenomena of inflammation in general, and bacterial infections in particular, are such that the article should be read in full by all interested in pathogenesis. The contents are discussed under eight main headings, and reference is made to 260 original papers, most of them of recent date.

In the first section the origin, distribution, and properties of the connective tissue "ground substances" are discussed, the main topic being the identification and characterization of hyaluronic acid. The importance of this constituent of the "intercellular cement" is stressed since it appears to be the substrate upon which many of the bacterial and tissue "spreading factors" act. Evidence is presented contrasting the ease with which metabolites traverse this ground substance, with the pronounced resistance which it affords to penetration by foreign materials, including infectious agents and their secretions.

The next section deals with those physiological factors which modify the permeability of connective tissues and thus influence infection and resistance, the general conclusion being that in each individual there exists a normal "tonus" of connective tissue permeability which does not change fortuitously but obeys certain definite rules. This permeability tonus is affected by constitutional factors [see LURIE—*V. B.* **10.** 438.], sex and hormones, individual and regional variations [see DURAN-REYNALS—*V. B.* **7.** 358, and JOYNER & SABIN—*V. B.* **9.** 636.], age and nutritional factors such as vitamin C [see WOLBACH & BESSEY—*V. B.* **13.** 102].

There follows a section on "spreading factors" (S.F.), their distribution, varieties, physical and chemical properties, and the characteristics of the *in vitro* and *in vivo* reactions produced by them. The relationship of enzymes present in tissue and bacterial extracts which are capable of hydrolysing hyaluronic acid, to some of the S.F. is described [see CHAIN & DUTHIE—*V. B.* **11.** 382.], and the resultant explanation of the spreading of infectious agents in animal tissues as due to an enzymatic effect on the hyaluronic acid of connective tissues is discussed [see MADINAVEITIA—*V. B.* **11.** 384; HOBBY *et al.*—*V. B.* **11.** 617; MEYER *et al.*—*V. B.* **11.** 617; MCCLEAN—*V. B.* **2.** 529]. An analysis of the evidence leads the author to conclude that all factors endowed with an enzymatic effect on hyaluronic acid have a "spreading effect", but that the converse is not necessarily true.

Next comes a review of the unsettled question of whether or not these S.F. possess antigenic properties [see MCCLEAN—*V. B.* **7.** 289, and **11.** 617; HOBBY *et al.*—*V. B.* **11.** 617.], and a summary of the published evidence on the effect of S.F. on spreading in the skin and other tissues and on capillary permeability.

The author then deals with tissue S.F. in relation to bacterial and virus infections and shows that the increased spread which results from the injection of a S.F. with an infectious agent does not promote any new lesions, but merely acts as a magnifying device. He states that the addition of a S.F. to an infectious inoculum has never succeeded in overcoming natural resistance, or in altering the tissue affinity of viruses. Dealing with bacterial S.F. he declares that the important point to bear in mind is that bacterial S.F. are probably the first weapons used by bacteria against infected hosts: they act on a pre-existing physiological barrier, while the other bacterial weapons are directed against barriers (leucocytes, fibrin clots, etc.) which the invader itself has called forth. A summary follows of work on S.F. and staphylococcal, streptococcal, and pneumococcal infections, and their relationship to gas gangrene, diphtheria, and virus infections. In contrast to these organisms it is noted that many other species, pathogenic or not, are devoid of S.F., *e.g.* all types of tubercle bacilli, *Pasteurella pestis*, and *Bacillus anthracis* [see MCCLEAN—*V. B.* **7.** 289; HOBBY *et al.*—*V. B.* **11.** 617; MEYER *et al.*—*V. B.* **11.** 617].

The relationship of S.F. to bacterial invasiveness and virulence, and the concept of a "critical concentration" of pathogenic agents in infections and toxic phenomena are also discussed [see DURAN-REYNALS—*V. B.* **5.** 737].—J. LOCHIEL MCGIRR.

See also absts. **2036** (text-book), **1834** (immunity in TB.), **1927, 1928, 1932** (tumour immunity), **1962** (vitamins and immunity), **1864** (complement fixation with viruses), **2042** (biological products in Brazil).

PARASITES IN RELATION TO DISEASE [ARTHROPODS]

I. SMITH, C. N., & COLE, M. M. (1941). **Effect of Length of Day on the Activity and Hibernation of the American Dog Tick, *Dermacentor variabilis* (Say) (Acarina: Ixodidae).**—*Ann. ent. Soc. Amer.* **34.** 426–431. **1896**

II. GREGSON, J. D. (1942). **Host Immunity to Ticks (Acarina).**—*Proc. ent. Soc. B.C.* No. 38. pp. 12–13. [See also TRAGER—*V. B.* **9.** 715 & 716; **10.** 592]. **1897**

I. Evidence gathered under field conditions

indicates that tick activity is not wholly dependent upon temperature. In laboratory experiments extending over two winters, the authors subjected larval, nymphal, and adult dog ticks to extended and gradually increasing photoperiods of normal daylight supplemented by electric light, so controlled that the photoperiod of mid-winter was equivalent to that of midsummer. Feeding tests on meadow mice showed that larvae and nymphs engorged more readily than did control ticks, when conditions of extended or normal light remained the same for each group during engorgement as in the period before the test.

The authors conclude that length of daylight influences tick activity to a marked extent, and that activity is more marked during an increasing than during a decreasing photoperiod.

II. G. describes an experiment in which he considers that a partial immunity to attacks by *Dermacentor andersoni* was conferred upon one g. pig by means of four weekly subcutaneous injections of 2 ml. of an emulsion of half-engorged nymphal ticks freshly removed from a g. pig host. Serum from the g. pig failed to precipitate a 2 ml. saline emulsion of twenty half-engorged nymphs at dilutions as low as 1 : 5.

G. quotes evidence which in his opinion showed that two fitches [polecats] developed a partial immunity to infestation with *Ixodes texanus* as a result of infestation nine days previously. [Unfortunately, no controls were kept in this experiment. The apparent immunity could easily be explained as being the result of a diminishing photoperiod, since the experiment was performed in October].—G. B. S. Heath.

Gregson, J. D. (1942). **The Coast Tick (*Ixodes californicus* Banks) Problem in British Columbia.**—*Canad. Ent.* **74.** 3–5. **1898**

Marked increase in the population of *I. californicus* Banks during recent years appears to be associated with human settlement of the coastal regions. Lizards, which are abundant, act as hosts to larvae and nymphs, while adult stages feed on dogs, cats, deer, man, and cattle, the bites often causing severe local or systemic effects. The tick is not known to transmit any disease of man or domestic animals.—G. B. S. Heath.

See also absts. **2032** (horse ectoparasites), **1852** (vectors of trypanosomes), **1857** (of *Leucocytozoon*), **1859** (of piroplasms and anaplasms), **1866** (of neurotropic viruses), **1900** (of *Moniezia expansa*), **2011** (insecticides).

PARASITES IN RELATION TO DISEASE [HELMINTHS]

Robertson, D. (1942). **The Parasitic Worms of Sheep in Scotland and their Control.**—*Trans. Highl. agric. Soc. Scot.* **54.** 54–79. **1899**

R. discusses the helminths of importance occurring in Scottish sheep and, after giving an account of the life-cycle, pathogenicity, and treatment of the commoner species, reviews the question of their control, especially with regard to methods of pasture and sheep management. [R.'s assertion that the infective larvae of *Dictyocaulus filaria* are able to penetrate the skin will probably not be generally accepted by readers.]
—J. N. Oldham.

Potemkina, V. A. (1941). **[Contribution to the Biology of *Moniezia expansa*, a Tapeworm of Sheep and Goats].**—*Dokl. Akad. Nauk.* **30.** 474–476. [Abst. in *Helminth. Abstr.* **10.** 116, copied *verbatim*. Signed: A. E. F.] **1900**

Potemkina collected about 3,000 oribatid mites from pasture not grazed by cattle during the summer and autumn of 1940. The mites were fed with eggs from mature segments of *Moniezia expansa*, and were observed to devour the eggs greedily. 1,000 of the mites were dissected at intervals and all stages of development up to the cysticercoid were found in *Galumnus obvius* and *Scheloribates laevigatus*. Both these species were also found to be effective intermediaries for *Moniezia benedeni* and *Thysaniezia ovilla*.

Hughes, R. C., & Schultz, R. L. (1942). **The Genus *Raillietina* Fuhrmann 1920.**—*Bull. Okla. agric. mech. Coll.* **39.** No. 8. pp. 53. **1901**

This bulletin contains a list of 226 species of *Raillietina* with their synonyms, the orders to which the definitive hosts belong, geographical distribution, and references to any recent studies. A number of unnamed and unidentified species, and invalid specific names, and the subgenera of *Raillietina*, are also listed. References to life-history studies and records of intermediate hosts of *R. bonini*, *R. cesticillus*, *R. echinobothrida*, *R. friedbergeri*, *R. magninumida*, and *R. tetragona* are included. There is also a host catalogue and a complete list of references to articles published on this genus since 1899.—M. L. Bingham.

Elorrieta, L. de B. (1942). Notas sobre "la cisticercosis porcina" en el matadero de "la ganadera industrial Venezolana". **[Cysticercosis in Pigs of Venezuela].**—*Rev. Med. vet., B. Aires.* **24.** 536–539. **1902**

Cysticercosis was verified in 4·09% of pig carcasses examined in the abattoir of *La Ganadera Industrial Venezolana*. E. details the muscular regions most commonly affected, but stresses the fact that it is important to examine parts of the carcass other than those generally accepted as being commonly affected. He found the use of the microscope to be invaluable in inspecting doubtful cases.

It is stated that affected carcasses kept at 1°–4°C. for four weeks no longer contained viable cysts. [Mönnig states that *Cysticercus cellulosae* may remain viable in carcasses at 0°C. for about six weeks, but is killed by lower temperatures as soon as the liquid in the bladder becomes frozen.]—Miller Watson.

Most, H., & Helpern, M. (1941). **The Incidence of Trichinosis in New York City.**—*Amer. J. med. Sci.* **202.** 251–257. **1903**

Autopsy material was examined from 100 random cases of violent or sudden death in New York City. All specimens were examined by each of three methods, *viz*, the press (microscopical), histological, and digestion methods. Twenty-two cases of infection with *Trichinella spiralis* were found. The press method detected eight cases, histological examination 11, and digestion 21.

The presence of old, dead trichina cysts as well as young, viable larvae in the same specimen indicates the occurrence of reinfection in man.

Mauss, E. A., & Otto, G. F. (1942). **The Occurrence of Trichinella spiralis Larvae in Tissues other than Skeletal Muscles.**—*J. Lab. clin. Med.* **27.** 1384–1387. **1904**

Mice 5–6 weeks old were each fed with 450 trichina larvae isolated from rat muscle by peptic digestion; 4–15 days later the mice were killed and bled. Examination of the blood for trichina larvae was carried out, and the tissues were examined for the presence of larvae by means of crush preparations and serial sections. In 12 white mice killed 7–15 days after infection, 31 migrating larvae were recovered from tissues other than the blood and skeletal muscles, 24 being from the myocardium. It was not possible to demonstrate that the larvae were

actually in these tissues and not in blood vessels supplying the tissues. The authors estimate that for each larva found in other tissues there are approximately 10,000 in the skeletal muscles. They conclude that invasion of tissues other than skeletal muscles is not likely to cause significant damage unless the infection is extremely heavy.—T. E. GIBSON.

STEWART, W. L., & CROFTON, H. D. (1942). **"Black-rush"—A Form of Winter Trichostrongylosis in Northumberland.**—*Vet. Rec.* **54.** 515–516. **1905**

"Black-rush" is a fatal diarrhoea attacking young sheep, chiefly those of the hill breeds, during the winter. The sudden development of a dark, foul-smelling diarrhoea is the chief symptom. Other symptoms include anaemia, emaciation, and thirst. The disease runs a rapid course, death occurring in 1–4 days after the onset of diarrhoea in untreated cases. The cause is infestation of the stomach and intestines with large numbers of trichostrongyles, in association with deficient nutrition. The case histories are described of outbreaks on four farms, together with the P.M. findings in affected sheep, all of which showed heavy trichostrongyle burdens. In each outbreak, treatment with phenothiazine was undertaken and was effective in controlling most cases, although the weaker animals succumbed in some outbreaks. The authors point out that infestation acquired during the summer and autumn is the cause of outbreaks in early winter. It is suggested that prophylactic doses of phenothiazine should be administered to all young hill sheep in December.—T. E. GIBSON.

RIZHIKOV, K. M. (1941). **[Fresh Water Mulluse, *Limnaea stagnalis*, as a Reservoir Host of *Syngamus trachea*].**—*Dokl. Akad. Nauk.* **31.** 831–832. [Abst. in *Helminth. Abstr.* **10.** 116, copied *verbatim*. Signed: P. A. C.] **1906**

Rizhikov has completed experimentally the life-cycle of *Syngamus trachea* using *Limnaea stagnalis* as vector, obtaining finally heavy infestations in chickens. Most of the adults settled in the middle of the trachea, thus contrasting with the condition found when earthworms are used. He suggests that aquatic molluscs may spread infection to ducks and geese and even to crows and magpies, which are known to feed on such snails.

CHRISTENSON, R. O., EARLE, H. H., BUTLER, R. L., & CREEL, H. H. (1942). **Studies on the Eggs of *Ascaridia Galli* and *Heterakis Gallinae*.**—*Trans. Amer. micr. Soc.* **61.** 191–205. **1907**

The authors state that the eggs of *A. galli* and *H. gallinae* possess three essential membranes of the egg envelope, *viz*, the external proteinous membrane, the chitinous shell, and the lipoid vitelline membrane. The polar globules or opercula are associated with the vitelline membrane and may be absent, and, according to the authors, have no association with the hatching of the larvae.

Studies on the incubation of these eggs were also carried out, using weak formalin solution as the medium. At room temperature, infectivity was reached in 12–14 days, during which time intracapsular moulting had occurred, and such eggs were found to be capable of infecting fowls. It was also found that eggs of *H. gallinae* were killed when heated to 134°–136°F., and those of *A. galli* were killed by a temperature of 136°–138°F.

Eggs of *H. gallinae* and *A. galli* survived in 2% potassium dichromate solution at room temperature for 630 and 669 days respectively.—ANTHONY BUXTON.

See also abstr. **1991, 2012-2014** (anthelmintics).

SPONTANEOUS AND TRANSMISSIBLE NEOPLASMS AND LEUCAEMIAS [INCLUDING FOWL PARALYSIS]

I. BITTNER, J. J. (1937). **Mammary Tumors in Mice in Relation to Nursing.**—*Amer. J. Cancer.* **30.** 530–538. **1908**

II. BITTNER, J. J. (1939). **Relation of Nursing to the Extra-Chromosomal Theory of Breast Cancer in Mice.**—*Ibid.* **35.** 90–97. **1909**

III. BITTNER, J. J. (1939). **Breast Cancer in Mice.**—*Ibid.* **36.** 44–50. **1910**

IV. ANDERVONT, H. B., & MCELENEY, W. J. (1939). **The Influence of Foster Nursing upon the Incidence of Spontaneous Breast Cancer in Strain C_3H Mice.**—*Publ. Hlth Rep., Wash.* **54.** 1597–1603. **1911**

V. BITTNER, J. J. (1939). **The Influence of Transplanted Normal Tissue on Breast Cancer Ratios in Mice.**—*Ibid.* 1827–1831. **1912**

VI. BITTNER, J. J. (1940). **Further Studies on Active Milk Influence in Breast Cancer Production in Mice.**—*Proc. Soc. exp. Biol., N.Y.* **45.** 805–810. **1913**

VII. BARNES, W. A., & COLE, R. K. (1941). **The Effect of Nursing on the Incidence of Spontaneous Leukemia and Tumors in Mice.**—*Cancer Res.* **1.** 99–101. **1914**

VIII. ALLEN, E., & GARDNER, W. U. (1941). **Cancer of the Cervix of the Uterus in Hybrid Mice Following Long-Continued Administration of Estrogen.**—*Ibid.* 359–366. **1915**

IX. BITTNER, J. J. (1941). **The Preservation by Freezing and Drying in vacuo of the Milk-Influence for the Development of Breast Cancer in Mice.**—*Science.* **93.** 527–528. **1916**

X. WARNER, S. G. (1941). **The Effect of the Milk Factor Concentration on the Development of Spontaneous Tumors in Hybrids Derived from Reciprocal Cross of Two High Cancer Strains of Mice.**—*Cancer Res.* **1.** 738. [Only abst. given. Copied *verbatim*]. **1917**

XI. MURRAY, W. S. (1941). **Studies on the Effect of Foster Nursing and its Relation to the Development of Mammary Carcinoma in the Mouse.**—*Ibid.* 790–792. **1918**

XII. BITTNER, J. J. (1941). **Foster Nursing and Genetic Susceptibility for Tumors of the Breast in Mice.**—*Ibid.* 793–794. **1919**

XIII. VISSCHER, M. B., GREEN, R. G., BITTNER, J. J., BALL, Z. B., & SIEDENTOPF, H. A. (1942). **Characterization of Milk Influence in Spontaneous Mammary Carcinoma.**—*Proc. Soc. exp. Biol., N.Y.* **49.** 94–96. **1920**

XIV. LAW, L. W. (1942). **Foster Nursing and the Growth of Transplantable Leukemias in Mice.**—*Cancer Res.* **2.** 108–115. **1921**

XV. BRYAN, W. R., KAHLER, H., SHIMKIN, M. B., & ANDERVONT, H. B. (1942). **Extraction and Ultracentrifugation of Mammary Tumor Inciter of Mice.**—*J. nat. Cancer Inst.* **2.** 451–455. **1922**

XVI. BITTNER, J. J. (1942). **The Milk-Influence of Breast Tumours in Mice.**—*Science.* **95.** 462–463. **1923**

XVII. SHIMKIN, M. B., & ANDERVONT, H. B. (1942). **Effect of Foster Nursing on the Induction of Mammary and Testicular Tumors in Mice Injected with Stilbestrol.**—*J. nat. Cancer Inst.* **2.** 611–622. **1924**

XVIII. DEOME, K. B., STRAIT, L. A., & MCCAWLEY, E. L. (1942). **The Ultraviolet Spectrographic Examination of the Fat Fraction of Mouse Milk and Mammary Glands.**—*Science.* **96.** 301–302. **1925**

I. Breeding females of an inbred strain of mice, having a high incidence of spontaneous mammary carcinoma, showed a significant decrease in the incidence of mammary gland tumours after being nursed by low-tumour strain females. This fact tends to indicate that some factor is transmitted through the mother's milk which is of prime importance in determining the incidence of breast tumours. B. believes that this may offer an explanation for the extra-chromosomal influence in the aetiology of such tumours.

II. This article presents a short review of previous work on the subject, and records new observations on hybrid mice.

Reciprocal matings between high- and low-tumour strains confirmed the extrachromosomal theory of breast cancer in mice. When the maternal parent was from high-tumour stock, the F_1 and F_2 generation mice gave ratios which approached that of the maternal stock. In the reciprocal generations the percentages were very low.

III. B. presents evidence to show that breast tumour incidence may be increased or decreased without altering the inherited or genetic constitution of the mice. This is accomplished by fostering low-tumour strain mice with high-tumour strain mice, and *vice versa*.

The article includes a discussion on previous work on the comparative susceptibility to spontaneous and transplantable breast carcinoma.

IV. In confirmation of BITTNER'S work, the authors demonstrated the presence of a factor in the milk of a high cancer line of mice, which exerts a profound influence upon the occurrence of spontaneous breast tumours of sucklings. They also showed that the first milk is not essential for the development of breast tumours in high cancer strain mice, and that the milk factor is apparently present in the milk throughout the entire period of lactation. There was some evidence to show that the greater the amount of milk ingested from high cancer mothers, the earlier did breast tumour develop in the offspring.

V. By the inoculation of normal splenic, thymic, or lactating mammary tissue from young high-cancer stock female mice, B. was able to transmit an influence which produced results similar to those of the "breast cancer producing influence" normally present in the milk of cancer stock mice.

VI. This article contains a short summary of the published work on the active milk influence in inherited mammary carcinoma in mice. B. provides further evidence to show that the active influence is not present (or has been destroyed) in the liver of high-tumour stock mice.

VII. This study was undertaken in order to determine whether non-chromosomal factors, similar to those which influence the occurrence of breast tumours in mice, exist in relation to leucaemia.

By exchanging litters, within 12 hours of birth, it was found that young mice of a low leucaemic strain were not rendered leucaemic when nursed by mice of a high leucaemic strain. Young mice of a high leucaemic strain fostered by mice of a low leucaemic strain developed leucaemia in a lower percentage than their non-fostered relatives. A slightly higher intercurrent death rate among the fostered mice may have accounted in part for this lower percentage.

Control tests on the incidence of mammary carcinoma were made on mice of the same strains. Young mice of a high breast-tumour strain failed, with one exception, to develop tumours when nursed by mothers of a low breast-tumour strain. In the reciprocal test, young mice with a low breast-tumour incidence did not develop mammary carcinoma when nursed by mothers of a high breast-cancer strain.

In the stocks studied, the incidence of lung tumours was not significantly altered by fostering.

VIII. In these experiments, reciprocal crosses between low and relatively high mammary cancer strains were used. After long treatment with high doses of oestradiol benzoate, invasive lesions and squamous cell carcinomas of the uterine cervix appeared in 62% of mice nursed by females of the mammary cancer resistant strain, and 50% of mice nursed by females of the high cancer strain. Genetic factors and the milk influence involved in mammary cancer did not seem to have much effect as determining factors in cervical cancer. The high incidence of the latter in the treated mice emphasizes the fact that oestrogen is a very important factor in cervical carcinogenesis.

IX. Spontaneous mammary carcinomas were removed from mice under aseptic conditions, finely minced, and frozen immediately at −72°C. The material was then dried *in vacuo*. One part of dried tissue was mixed with two parts of water and filtered through filter paper. The filtrate was then fed to mice 4–5 weeks old, of a strain in which there was a low incidence of breast cancer in the virgin females. The mice were fostered from birth by a female of a low breast-cancerous strain. Six of the ten mice used developed breast tumours within 12·4 months. From the results, B. considers that the active milk influence may be a virus.

X. Mice of this inbred stock arrange themselves on a graduated scale because of (a) the concentration of the milk stimulus which they transmit, and (b) the resistance to the stimulus. By the methods presented it is possible to measure roughly the difference in the amount of cancer which these concentrations of the extra-chromosomal stimulus will produce. It is found that the A stock factor will produce approximately three times as much cancer as the Marsh stock factor when both are acting upon the same physiological constitution.

XI. In experiments carried out on 2,230 animals, M. attempts to separate and evaluate the parts which chromosomal and extra-chromosomal influences play in the development of mammary carcinoma in mice. He gives evidence to show that the ratios in which mammary tumours occur in inbred strains and experimental crosses may be reasonably explained upon the basis of the strength of the milk stimulus which the mice receive and the resistance of the physiological systems produced by these matings to various concentrations of the milk stimulus.

XII. Breeding experiments revealed the fact that in mice, foster nursing, with a reduction in the incidence of tumours, does not influence the genetic susceptibility of an individual for the development of spontaneous mammary carcinoma.

XIII. A suspension in distilled water of lactating mammary glands, with the contained milk, from two high cancer strains of mice, was separated into several fractions by ultracentrifugation. After 15,000 r.p.m. for 30 min., the material separated into a fat fraction, a middle aqueous layer and sediment. The middle aqueous layer was spun again, at 40,000 r.p.m. for 60 min., and it separated into a supernatant layer and sediment. Eighty-four mice were fed, or injected subcutaneously, with one of the following:– (1) tissue suspension, (2) fat fraction, (3) first sediment, (4) second sediment, (5) second supernatant fluid.

At the age of 12 months the highest incidence of mammary carcinoma (71%), was in the group given tissue suspension. 55% of the mice given the second sediment, and 41% of those given the first sediment developed cancer. Only 14% of those receiving the fat fraction were affected, while none of the animals given

the final supernatant fluid developed cancer. It appears probable that the active milk influence of spontaneous mammary carcinoma in mice is a colloid of high molecular weight, and may be a virus.

XIV. The degree of resistance against progressive growth of inoculated leucaemic cells, characteristic of certain refractory strains of mice, was reduced by foster nursing of the refractory mice by mothers of a susceptible strain.

The milk influence present in one strain of mice was shown to affect the growth of two transplantable lymphoid leucaemias, but not the growth of a myeloid leucaemia. This susceptibility influence is apparently present during the first 6–7 days of the lactation period. Total deprivation of " susceptible " milk in young of a susceptible strain, followed by foster nursing by females of a refractory strain, does not affect the response of these mice to inoculations of leucaemic cells.

A change in the growth capacity of the malignant cells of two lymphoid leuccemias and one myeloid leucaemia was observed, whereby leucaemic cells could be grown by serial transfer in refractory mice. This occurred following initial growth of the malignant cells in refractory foster-nursed mice.

XV. Extracts in saline of spontaneous mammary carcinoma tissue, derived from mice, were found to give rise to similar tumours when fed to susceptible mice.

Separated milk from a high tumour strain of mice was centrifuged for one hour at 60,000 times gravity. Both the sediment and the supernatant fluid were found to be capable of transmitting mammary carcinoma when fed to susceptible mice. The sediment gave rise to mammary cancer in 82·3% of the mice, and the supernatant in 41·2%. Only 4·3% of the control mice developed mammary tumour.

The results indicate that the size of the milk factor is less than that of some of the larger known viruses, *e.g.* vaccinia virus, which is sedimented by a much smaller force. Also it is evident that mammary cancer can be transmitted by cell-free material, since no cells could be present in the supernatant after the ultracentrifugation treatment.

XVI. Lactating females of a cancerous strain were killed, and their mammary glands removed. Seitz filtrates, or extracts of glycerin-treated gland tissue, given by subcutaneous or intraperitoneal injection to females of a strain having a normal incidence of breast tumours of 1–2%, raised the incidence to 41%. Unfiltered macerated tissue given by mouth to 36 mice raised the incidence of carcinoma from a normal 1% to 67%.

XVII. Foster nursing of mice of a strain with a high incidence of mammary carcinoma, by mice of a low cancer strain, reduced markedly the incidence of mammary tumours in both males and females receiving large doses of stilboestrol subcutaneously. Conversely, foster nursing of a low cancer strain, by mice of a high cancer strain increased the incidence of mammary tumours in male and female mice treated with oestrogen.

Foster nursing did not affect the weight increment following stilboestrol administration. It was shown that the incidence and latent period of primary interstitial-cell tumours of the testis induced by stilboestrol in a low cancer strain were not affected by the presence or absence of the milk factor in the mice.

It is considered that the oestrogens prepare a substrate in the breast of the mouse for the carcinogenic action of the milk factor.

XVIII. Extracts of the fat fraction of milk and mammary tissue of high tumour and low tumour strains of mice were submitted to ultra-violet spectrographic examination. The object of the experiment was to demonstrate the presence of oestrogens or known synthetic carcinogenic hydrocarbons, and to correlate the findings with the presence of milk factor. There were no significant differences between the absorption spectra of material from high and low tumour strain mice. The results indicate that (1) the milk factor was not present in the fat fraction, or (2) that it was not spectrographically similar to the carcinogenic hydrocarbons or oestrogens, or (3) that it was present in quantities too small to be detected spectrographically.

Since this work was started, VISSCHER *et al.* [see no. XII] have demonstrated that the milk factor is primarily in the non-fat fractions. Similar experiments are therefore being carried out on these fractions.

—ISOBEL W. BURTON.

FURTH, J., COLE, R. K., & BOON, M. C. (1942). **The Effect of Maternal Influence upon Spontaneous Leukemia of Mice.**—*Cancer Res.* **2.** 280–283. **1926**

Reciprocal crosses and reciprocal foster nursings were made between mice of a high leucaemia stock, Ak, and mice of a low leucaemia, high breast-cancer stock, C_3H. The incidence of leucaemia was lower when mice from the C_3H stock were used as the dams and the effect was observed in both the male and female progeny. There was, however, a sex difference as regards incidence of leucaemia in the reciprocal crosses, the difference being much greater among the males, showing that the differences in the incidence of leucaemia among the F_1 populations were due entirely to differences in the incidence of the disease among the male populations. In both F_1 hybrids the peak in the leucaemic mortality occurred later than in the high leucaemic stock, and the retardation of occurrence of the disease was greater in $C_3H \times Ak$ than in $Ak \times C_3H$ hybrids.

The results of reciprocal foster nursings showed that nursing by Ak dams did not render C_3H mice leucaemic; fostering of Ak mice by C_3H dams significantly lowered the incidence of leucaemia in both sexes, but offspring of fostered Ak mice had as high an incidence of leucaemia as non-fostered Ak stock. Therefore this nursing influence, unlike the BITTNER factor [see preceding group of absts.) which was also confirmed in these experiments, is not transmitted to the progeny.—R. ALLCROFT.

CHEEVER, F. S., & MORGAN, H. R. (1942). **Mechanism of Tumor Immunity as Investigated by Means of the Intraocular Inoculation of the Brown-Pearce Carcinoma.**—*Cancer Res.* **2.** 675–679. [Authors' summary copied *verbatim*]. **1927**

1. The implantation of fragments of the Brown-Pearce carcinoma into the anterior chamber of the eye of normal animals was followed by successful takes in most instances, regardless of whether the inoculation was unilateral or bilateral.

2. Secondary intraocular inoculation in animals immunized by any one of several standard methods was unsuccessful in 18 of 20 cases.

3. Secondary intraocular inoculations as long as four months after the primary implantation of tumor into the other eye were generally successful, regardless of the state of activity of the first growth at this time.

4. Of 11 tumor fragments remaining as long as 14 days in the eyes of immune animals only 2 proved viable and capable of delayed but sustained proliferation when implanted into the eyes of normal animals.

5. This evidence, though far from unequivocal, suggests the existence of an agent in the aqueous humor of immune rabbits' eyes capable of destroying or rendering nonmalignant the cells of the Brown-Pearce carcinoma.

GREENE, H. S. N. (1942). **The Participation of the Anterior Chamber of the Eye in Resistance Phenomena Related to Tumor Growth.**—*Cancer Res.* **2.** 669–674. [Author's summary copied *verbatim*]. **1928**

A series of experiments was performed in an attempt to ascertain whether or not a blood—aqueous humor barrier separated the anterior chamber of the eye from the remainder of the body, and thus determined the ease with which tumor transplantation was effected at this site. It was found that, following tumor growth in the anterior chamber of one eye, both the testicle and the anterior chamber of the opposite side were resistant to reinoculation. On this basis it was concluded that the aqueous humor was not an isolated fluid but participated in general body reactions, and that its susceptibility to tumor transfer was not determined by an antibody barrier.

An interpretation of other reinoculation experiments, based on this conclusion, suggested that the resistance-provoking powers of the tumors used were directly related to their growth rates and longevity. The ability of the various tumors to grow in partially resistant hosts appeared, on the other hand, to be a function of their stromal requirements.

GREENE, H. S. N. (1942). **Heterologous Transplantation of a Human Fibrosarcoma.**—*Cancer Res.* **2.** 649–654. [Author's summary copied *verbatim*]. **1929**

A human fibrosarcoma was successfully transplanted to the anterior chamber of the eyes of guinea pigs and has been carried by serial transfer through 14 generations over a period of 2 years. In addition the tumor has been successfully transferred to the guinea pig's testicle.

STEINER, P. E., KLÜVER, H., & BRUNSCHWIG, A. (1942). **Three Carcinomas of the Tongue in Two Monkeys.**—*Cancer Res.* **2.** 704–709. [Authors' summary copied *verbatim*]. **1930**

Three squamous cell carcinomas of the tongue [two in one animal and one in the other] occurred simultaneously in 2 macaque monkeys (*Macaca mulatta* and *Macaca irus*) in a primate colony. One monkey died of aspiration pneumonia with local tumor metastases, and the other died postoperatively without metastases. Attempts at transmission were made and remain negative after 3½ months. None of the commonly quoted etiological factors for cancer of the tongue in man were present except that both were elderly males. Both had experimental brain lesions of long standing. This is the first report of cancer of the tongue in subhuman primates, and also the first in nondomesticated animals.

COMAN, D. R. (1942). **Human Neoplasms in Tissue Culture.**—*Cancer Res.* **2.** 618–625. [Author's summary copied *verbatim*]. **1931**

Various human neoplasms have been cultured by the roller tube method and their patterns of growth have been described and photographed. These tumors included carcinomas, sarcomas, and various benign growths.

Benign glandular epithelial tumors formed acini after a month of culture, whereas malignant epithelial tumors never formed acini.

A squamous cell carcinoma produced structures *in vitro* resembling epithelial pearls.

Individual neoplastic epithelial cells frequently broke away from the cell clusters and displayed ameboid movement. Such isolated cells sometimes gave rise to new colonies. The possible significance of this in relation to the mechanism of invasion and metastasis is mentioned.

Lymphosarcomas produced lymphoblasts in two instances and only macrophages in a third. This suggested a possible heterogeneity in the histogenesis of the lymphoblastomas.

An angiosarcoma formed endothelial tubes *in vitro*. These structures resembled vessels and produced lateral branches.

Some neoplasms that presented a similar appearance in histologic sections behaved differently *in vitro*. These differences were noted both in the neoplastic cells themselves and also in the cells of the stroma,

The feasibility of the roller tube method for the study of a wide variety of living human neoplasms is demonstrated and its value as a method in investigative oncology emphasized.

SPENCER, R. R. (1942). **Tumor Immunity.**—*J. nat. Cancer Inst.* **2.** 317–332. **1932**

This is a review of the more important observations discussed in previous reviews and of the more significant studies in tumour immunity made in recent years. Tumour immunity cannot be compared with immunity produced against bacterial invasion. Some observations which are given in detail seem thoroughly to discourage any hope of a tumour therapy being developed based on immunity principles. The apparent role which lymphocytes play in producing tumour immunity and the validity of the theory of " necrohormones " (chemical substances elaborated from dying cells) are discussed. The existence of specific anti-cancer cell antibodies described by LUMSDEN has never been proved, and reasons are given why his conclusions have not generally been accepted. Two chapters deal with heterotransplantation and immunity induced by cutaneous inoculations. Valuable information is also given in a chapter on recent miscellaneous observations such as the separation of a tumour growth-inhibiting factor derived from placenta or mammary glands of pregnant rabbits and cows and of a factor derived from Brown-Pearce rabbit tumour which increases the incidence of primary tumours and metastases. Observations on leucemia and significant quantitative differences in the chemical constituents of tumours and in some of their enzymatic systems as compared with those of normal tissues are also recorded. In conclusion, it is pointed out that there is no reason to believe that the behaviour of cancer cells as a whole can be explained satisfactorily on the basis of antigenic differences between their cellular components and those of normal homologous cell components.—H. LASER.

STRONG, L. C. (1942). **The Origin of Some Inbred Mice.**—*Cancer Res.* **2.** 531–539. [Author's summary copied *verbatim*]. **1933**

Data are presented showing the origin of 11 inbred strains of mice which are now being used in cancer and other biological research. Among these strains the A, C_3H, CBA, and I are well known as indicated, partially, by the analysis of the use of mice in Hartwell's monograph [*V. B.* **13.** 236.] on carcinogenesis. The others, the CHI, $C_{12}I$, C, JK, F, L, and N have also been inbred for at least 17 years. It is shown that the A, C_3H, CBA, CHI, $C_{12}I$, and C are somewhat genetically related although they have been separated from each other by 20 years of inbreeding. The other strains are not related to any of these or to each other. A representative survey of the contributions that have been made possible, in part, by the use of these strains is also included.

BREEDIS, C. (1942). **The Action of Extreme Cold on Leukemic Cells of Mice.**—*J. exp. Med.* **76.** 221–240. **1934**

Suspensions of leucaemic cells of mice from three different strains and of particles from spleen and lymph

nodes were subjected to rapid or slow freezing and to rapid or slow thawing. Suspensions rapidly frozen to −196°C. were in all cases innocuous, whereas those frozen slowly to the same temperature were capable of transmitting leucaemia. The rate of thawing was immaterial for two strains, while for the third strain, rapid thawing was less injurious than slow thawing. Suspensions slowly frozen to −2°C. or lower and then rapidly cooled to −196°C. could no longer be completely inactivated, *i.e.* slow freezing up to −15°C. had a protective action against subsequent rapid cooling to −196°C. The changes, therefore, which lead to complete inactivation of the leucaemic cell material take place during rapid transition from the liquid to the solid state in a temperature range between freezing point and −15°C.—H. Laser.

Emmerson, M. A. (1943). **An Unusual Form of Bovine Lymphosarcomatosis.**—*Vet. Ext. Quart. Univ. Pa.* No. 89. pp. 28–36. **1935**

A case of lymphosarcomatosis in an eight-year-old Jersey bull is recorded. Symptoms included anorexia, complete prolapse of the left eye, stertorous breathing, and swelling and induration of the neck, shoulder and thigh muscles. Autopsy showed bilateral exophthalmos with excessive proliferation of granulation tissue round the left eye. There was opacity and thickening of the cornea of the right eye. The skeletal muscles at several points were infiltrated and pale in colour. There was considerable swelling especially in the neck region. The sterno-thyro-hyoid muscle was completely involved. The laryngeal muscles were enlarged, causing partial closure of the glottis, and the right ureter was blocked. Histological examination revealed a rare form of lymphosarcoma involving both voluntary and smooth muscles.—D. D. Ogilvie.

Shemin, D., & Sproul, E. E. (1942). **Studies of the Transmissible Agent of Chicken Sarcoma I. Isolation of Virus from Basic Protein-Virus Complex.**—*Cancer Res.* **2.** 514–516. [Authors' summary copied *verbatim*]. **1936**

On high speed centrifugation of a saline solution of the material precipitated from a chicken sarcoma I extract by the addition of papain, a highly active fraction was obtained which was free of papain and electrophoretically homogeneous at pH 7·4.

See also abst. **1942** (fowl paralysis).

DISEASES, GENERAL

Davis, C. L. (1942). **Lesions of Certain Infectious and Neoplastic Diseases of Domestic Animals which are also Common to Man.**—*J. tech. Meth.* No. 22. pp. 18–25. Discussion pp. 25–26. **1937**

D. summarizes the main pathological characteristics of actinomycosis, actinobacillosis, brucellosis, coccidioidal granuloma, swine erysipelas, and certain neoplasms. [Paper presented at a symposium on comparative pathology.]—J. E.

Goss, L. J. (1942). **Pathology of Captive Wild Animals.**—*J. tech. Meth.* No. 22. pp. 27–33. Discussion p. 33. **1938**

A description of a few recent cases of death or disease in animals at the New York Zoological Park, *viz*, carcinoma of the pancreas in two bears, muscular dystrophy in tree kangaroos, *Salmonella typhi-murium* infection in canaries, actinomycosis and actinobacillosis in kangaroos, cattle, and antelopes, dental caries in a hyrax, goitre in a camel, and death from unknown cause in a panda.—J. E.

Montabaur, H. (1942). Der Wert des Röntgenbildes für die Prognose der chronischen Rehe des Pferdes. **[Value of X-Ray Picture for Prognosis of Chronic Laminitis in the Horse].**—*Z. Veterinärk.* **54.** 145–153. **1939**

Owing to the difficulty of making a reliable prognosis in horses with chronic laminitis, M. has used radiography (latero-medial and dorso-volar positions) as an additional aid. The results were disappointing since animals which showed gross abnormalities (dislocation of the os pedis, exostoses, ossification of the lateral cartilages) not infrequently became workably sound: furthermore, the interpretation of radiographs in less severe cases is extremely difficult. Protocols of five cases are given and three of them are illustrated by radiographs.—E. G. White.

Jones, T. C., & Ash, J. E. (1942). **Equine Periodic Ophthalmia.**—*J. tech. Meth.* No. 22. pp. 34–39. Discussion pp. 39–40. **1940**

The disease is described, with special reference to pathological findings of which some photomicrographs are included.

In the acute stage of fresh cases there is conjunctival hyperaemia, discoloration of the iris, contraction of the pupil, vascularization of the periphery of the cornea, and exudate in the anterior chamber. On section there can be seen fibrinous exudate over the ciliary body and processes and posterior synechia may be present, all these changes constituting an acute iridocyclitis.

In the quiescent stage the findings vary according to chronicity and are such as to show progressively increasing damage from the recurrent attacks to the cornea, aqueous humour, iris, and lens. Old cases show a more or less destroyed eye with all parts deformed.

The authors do not consider that brucella infection has any connexion with periodic ophthalmia.—J. E.

Turner, C. W., & Berousek, E. R. (1942). **Blind Halves in a Goat's Udder.**—*J. Dairy Sci.* **25.** 549–555. [Authors' summary copied *verbatim*]. **1941**

A case of a goat is reported which failed to give milk after parturition. It was found that both halves were blind. The gland tissue was capable of secreting milk but the primary milk ducts ended blindly. It is believed that this condition is due to an inherited or developmental defect in the glands rather than to the development of connective tissue overgrowth resulting from mastitic infection.

Sturkie, P. D. (1943). **Five Years of Selection for Viability in White Leghorn Chickens.**—*Poult. Sci.* **22.** 155–160. **1942**

As a result of five years' selection for disease resistance, adult mortality in a flock of hens decreased from 89% in 1935 to 27% in 1940, and the survival age of those which died during the test period increased from 299 days in 1935 to 363 days in 1940. Approximately two-thirds of the deaths in 1935 and 1936 were due to fowl paralysis (leucosis), while in 1940 less than 14% of the deaths resulted from this cause. The majority of the deaths in 1939 and 1940 were due to nonspecific disorders. The results of the experiment are held to demonstrate that by the development of superior inbred families, uniformly high livability and egg production, and consistently large egg size can be attained.—N. J. Scorgie.

Jacobson, N. L., Espe, D., & Connon, C. Y. (1942). **Factors Modifying the Rate of Fermentation of Rumen Ingesta and their Possible Relation to Bloat in Dairy Cattle.**—*J. Dairy. Sci.* **25.** 785–799. **1943**

The quantity and rate of gas produced by ingesta obtained from the rumen of a cow with a permanent

fistula was measured *in vitro* at hourly intervals for five hours and then at 20 hours' incubation. Gas production was most rapid during the first hour and then progressively declined. The addition of silage to a standard ration of hay and mixed grains depressed gas formation, while the addition of blue grass or green alfalfa to the ingesta *in vitro* produced greater acidity but no increase in the gas production. Ingesta taken 24 hours after the last meal were alkaline and gas production was slow.

Changes of temperature and pH within the range of the rumen were without effect as was also dilution. The addition of salt to the ingesta did not inhibit gas formation but the addition of limestone greatly accelerated it, probably due to its buffering activity. Acetic and lactic acids in large doses inhibited gas formation although the latter acid in small doses stimulated it. Sugars [concentration not stated] had an initial inhibiting effect. Of all agents tried, sodium formate had the greatest effect in accelerating gas formation. As none of the experiments provided evidence regarding the aetiology of " bloat ", the authors put forward a theory based upon physical factors.—A. T. PHILLIPSON.

ANDERSEN, T. T., & TULINIUS, S. (1940). **Experimental Chronic Hepatitis (Cirrhosis) Based on Infection.**—*Acta med. scand.* **104.** 550–560. [In English]. **1944**

A brief review is given of some of the literature pertaining to the attempted induction of cirrhosis in experimental animals, and some original experiments with pigs are described. The technique was apparently that adopted in earlier studies [see *V. B.* **8.** 597, and **12.** 293–294], but in view of the topical importance of the subject, the experimental data are abstracted in some detail.

Duodenal juice was extracted, by means of an Einhorn duodenal tube, from human patients with epidemic hepatitis, and 25 ml. per head was fed by mouth (mixed with the food) to two piglets 6–8 weeks old which for ten days prior to the experiment had received a quantitatively poor but qualitatively adequate diet, of which no details are given. It is stated that the disease does not occur in the case of normally fed animals.

Minced liver from pigs in which disease had been set up with human duodenal juice was then fed to two other piglets, and in two more cases, liver from jaundiced pigs obtained from an abattoir was fed. No clinical or pathological details of the naturally jaundiced pigs are given.

One of each pair of pigs was slaughtered on the fourth day, by which time the blood plasma in both cases was slightly icteric and the liver was enlarged, swollen, soft, pale, and brownish-yellow in colour, with an indistinct pattern and with microscopic evidence of acute parenchymatous damage, the hepatic cells showing granular cytoplasm and pyknotic nuclei, and the vessels being compressed. The other member of each pair was fattened for ten months, by which time the weight was 200 kg. On slaughter, the liver of both animals was enlarged, dark, granular, and extremely firm, with some degree of perihepatitis. There was histological evidence of inflammation, mainly intestinal, regarded as pre-cirrhotic. The livers of negative controls remained normal.—ALASTAIR N. WORDEN.

FARLEY, H. (1941). **Keratitis. The virulence, transmissibility and course of bovine " pinkeye ".**—*Vet. Student, Iowa.* **3.** 74–76. **1945**

Keratitis of cattle has been reported from almost all parts of the U.S.A., but is most prevalent in the Middle West. It is primarily a disease of young animals. Under laboratory conditions the period of incubation is 3–21 days. As the disease normally appears in summer, flies have been suggested as possible vectors. Experiments to support this hypothesis have been unsuccessful. The disease occurs as mild, acute, and chronic types. Calves which have recovered from the acute or chronic types are immune, but those which have recovered from the mild type can be reinfected by artificial exposure. Antiserum from calves recovered from the acute type has failed, however, to protect test animals under laboratory conditions. Transmission experiments have shown that some natural immunity exists. [This appears to be quite a different condition from the kerato-conjunctivitis of cattle associated with rickettsia. See *V. B.* **12.** 448.]—D. D. OGILVIE.

*AUSTEN, E. (1941). Ueber die Afterpenismuskeln beim Zuchtbullen. **[The Retractor Penis Muscle in Breeding Bulls].**—*Inaug. Diss., Hanover.* [Abst. from abst. in *Dtsch. tierärztl. Wschr.* **50.** 273.] **1946**

Investigating the nature of impotence in bulls which responds to section of the retractor penis muscle, A. examined the muscle from 40 slaughter bulls and parts of the muscle removed from other bulls during operation to cure impotence, but failed to find any pathological condition. It is possibly due to defective sensory innervation.—J. E.

DOYLE, L. P., SEARCY, G. L., & ANDREWS, F. N. (1943). **A Pathological Condition of the Fowl Testis.**—*Poult. Sci.* **22.** 188–189. **1947**

The testis was markedly atrophic, weighing less than half that of a normal cockerel of similar age. Peculiar histological changes were present in the seminiferous tubules; spermatogenesis had ceased and the cells showed metaplastic changes. The basal row of germinal cells was relatively normal, but all the other germinal elements were atypical. There was a marked tendency towards syncytium formation and the production of multinucleated giant cells, many of which showed degenerative changes and vacuolation. The changes described must have proceeded rapidly, for reasonably large numbers of spermatozoa had been secured by the massage method 2–3 weeks before autopsy.—N. J. S.

KENNEDY, T. H. (1942). **Thio-Ureas as Goitrogenic Substances. [Correspondence].** — *Nature, Lond.* **150.** 233–234. **1948**

It was previously suggested that the goitrogenic substance present in rape seed was a derivative of urea [see *V. B.* **12.** 509]. Doses of 20 mg. of allyl thiourea were given daily by stomach tube to rats, and after eight weeks of this treatment the thyroids of these rats were found to be 3–4 times heavier than normal and almost completely devoid of colloid. The changes in both thyroid and pituitary were similar to those produced by feeding a diet containing rape seed.—G. D. S.

MATZKE, M. (1942). Ein Beitrag zum sog. " Eierherzen " beim Huhn. **[" Egg Hearts " in Fowls].**—*Berl. Münch. tierärztl. Wschr.* Sept. 18th. 283–284. **1949**

" Egg hearts ", so called from their appearance, are simply hypertrophied hearts, the left ventricle being chiefly affected. There was some degree of fatty degeneration of the hypertrophied myocardium. The lesion was found in 21 hens sent for P.M. examination. Nineteen were of the " Italian breed ", one a Rhode Island Red, and one a crossbred bird. The hens were otherwise healthy and the cause was not determined.—J. E.

STURKIE, P. D. (1942). **A New Type of Autosomal Nakedness in the Domestic Fowl.**—*J. Hered.* **33.** 202–208. **1950**

A type of genetic nakedness, associated with the absence of pterylae, is described. The character was observed in one Rhode Island Red male chick out of a

batch of 5,000 from non-pedigree matings in 1939. This chick was reared and subsequently mated to normal hens, which produced 335 naked and 348 normal chicks in the F_1 generation. Heterozygous males of this generation were mated with normal hens, and again the ratio of naked to affected progeny was 1 : 1. The character is not sex-linked, and the F_2 ratio of affected : normal was approximately 3 : 1.

Varying gradations of nakedness were seen in affected offspring, which were difficult to rear. Mortality was highest during the first 15 days of life, and was higher among chicks fed a dry mash than among those fed a wet mash. It was found that the naked chicks consumed about one-third less feed per day than normal chicks when both were fed a dry mash, but food consumption was increased by feeding a wet mash. The body weight of affected birds remained subnormal even at one year of age, and it is suggested that the lethality of the factor is associated with decreased food consumption and not with the effects of exposure.—A. N. W.

Broadhurst, J., Maclean, M. E., & Peterson, E. H. (1942). **The Similarity of Cytoplasmic Inclusions in Infant Pneumonitis and Bovine Epithelial Cells.**—*Cornell Vet.* **32.** 390–394. **1951**

Cytoplasmic inclusions are found in the buccal epithelial cells of young infants affected with primary virus pneumonitis, and the authors describe similar inclusions in the epithelial cells of the mucosa of the cheek in two of five cows. In both species the inclusions are commonly in close apposition to the nucleus and are also present scattered throughout the cytoplasm. The similarities between the inclusions in infants and cattle are strikingly illustrated by photographs of bovine buccal epithelial cells and similar cells from three cases of infant pneumonitis occurring in New Jersey in 1939. It is suggested that raw milk may be the source of the outbreaks in infants. In the two epidemics in Minneapolis the mortality was 20%.—E. G. White.

Burrows, H., Iball, J., & Roe, E. M. F. (1942). **Electrical Changes in Wounds and Inflamed Tissues. Part I: The Bioelectric Potentials of Cutaneous Wounds in Rats.**—*Brit. J. exp. Path.* **23.** 253–264. [Authors' summary copied *verbatim*]. **1952**

The immediate changes in potential which occur on injuring the skin have been examined in a series of Wistar rats, taking potential differences between a superficial cut and three earthed reference-points on the skin of the back. The changes have been compared with the normal drift of potential between these measuring-points during small intervals of time comparable with the wounding period. In nearly all cases wounding causes an increase in potential, up to 42 mv., the wound being positive with respect to the uninjured region when the direction of current in the external circuit is considered.

See also absts. **2041** (keeping livestock healthy), **2037** (pathology).

NUTRITIONAL AND METABOLIC DISORDERS

Parker, J. E., & McSpadden, B. J. (1943). **Influence of Feed Restriction on Fertility in Male Domestic Fowls.**—*Poult. Sci.* **22.** 170–177. **1953**

Results obtained from experiments, in which the feed consumption of Rhode Island Red cockerels was restricted to 72–42% of the amounts consumed by the controls, showed that inanition had a marked influence upon reproduction. Semen volume, number of sperm per collection, and fertilizing capacity were all adversely influenced when feed consumption was restricted. There was some evidence that the reproductive system is more resistant to inanition during the spring months than at other times. After seven months of restricted feeding, only two of nine males in the experimental group were still producing semen. Reduction of feed consumption was also observed to be related to pronounced atrophy of testes and combs. These results support the findings of other workers who showed that the gonadotropic potency of the pituitary of rats is decreased by underfeeding.—N. J. Scorgie.

Schlotthauer, C. F., & Berryman, G. H. (1943). **Production of Anemia in Dogs Due to Feeding Onions.**—*J. Amer. vet. med. Ass.* **102.** 109–111. **1954**

Two puppies, initially three and five months of age, were used. After maintenance for ten days on a commercial tinned dog food, 20 g. of chopped raw onion was added to the diet, and the daily allowance of raw onion gradually increased until a level of 10 g. per kg. body weight daily was reached after 15 and 71 days respectively. Anaemia [as originally described in 1930 by Sebrell (*Publ. Hlth Rep., Wash.* **45.** 1175.)] developed after three weeks, but remission was noted when the onion was withheld for 2–3 days or if onions stored after chopping were employed. Blood counts fluctuated somewhat but after 150 days, the red blood cell values were 2,662,000 and 3,900,000 per cu. mm., and the white cell counts 10,300 and 13,800 per cu. mm. respectively. One animal died a few days later and the other was killed after 194 days, there being no other findings of significance.—Alastair N. Worden.

Chaikoff, I. L., Eichorn, K. B., Connor, C. L., & Entenman, C. (1943). **The Production of Cirrhosis in the Liver of the Normal Dog by Prolonged Feeding of a High-Fat Diet.**—*Amer. J. Path.* **19.** 9–21. **1955**

A ration consisting of 7 g. of lean meat + 10 g. of lard per kg. initial body weight, 1–3 g. of bone ash at each meal, 1 g. of Cowgill's salt mixture per day, cod liver oil, and a commercial source of the vitamin B complex was fed for periods varying from five weeks to 3½ years to 11 bitches and eight male dogs. Hepatic lesions varying from early slight fibrosis to a marked nodular cirrhosis occurred in all cases in which the feeding was continued after 15 weeks. Fatty livers were present in the five animals which died or were slaughtered after 5–13 weeks.—Alastair N. Worden.

Braude, R., Kon, S. K., & White, E. G. (1943). **Yeast as a Protein Supplement for Pigs and its Relation to the Appearance of Rickets.**—*J. comp. Path.* **53.** 161–189. **1956**

Experimental results showed that all the protein required by the fattening pig can be supplied by yeast whether the type of yeast fed is brewers' yeast, debittered yeast, or fodder yeast. Dried yeast fed at a level of 8% of the diet with 1·5% $CaCO_3$ did not produce abnormal conditions, but when the yeast was fed at a level of 20% of the diet with 2% limestone added, rickets was produced early in the experimental period. The addition of 0·3–1% cod liver oil to the 20% yeast diet prevented the occurrence of rickets. The adverse symptoms could not be reproduced by adding to the 8% yeast diet Ca and P salts to bring the level of Ca and P to that of the 20% yeast diet.—G. D. S.

Craig, J. F., & Davies, G. O. (1943). **Rickets in Calves.**—*J. comp. Path.* **53.** 196–198. **1957**

Rickets occurred in three calves, one of which was destroyed before examination, from a herd of dairy Shorthorn cows. The animals were about five months old; they were somewhat stiff in their gait, but the prominent feature was the inability to close the mouth

and protrusion of the tongue for 2–3 inches. The bodies of the mandibles and rami seemed somewhat soft and thickened and as a result there was considerable salivation and the calves had difficulty in picking up and grinding the hay provided. The Ca, P, and Mg content of the blood appeared to be normal except in one animal which had a slightly low serum Ca, but this animal gave a pronounced positive tuberculin reaction. The other surviving calf received 1 oz. of bone meal in the food per day and it improved in condition and growth. After three months of this treatment, the thickening in the joints had disappeared, the salivation had ceased and the tongue had completely retracted into the mouth.—G. D. S.

BERRY, G. B. (1942). **The Effect of Sunshine upon the Antirachitic Potency of Butter.**—*Proc. Okla. Acad. Sci.* **22.** 27–30. **1958**

Butter made from the milk of cows in Oklahoma and that from cows in a northern region with less sunshine were fed to rats which had been rendered rachitic. It was found that there was an appreciable difference in the antirachitic potency of Oklahoma butter fat as compared with that from the region of less sunshine. From the results of the experiment with rats, it is calculated that the Oklahoma butter used contained 57 United States Pharmacopoeia units of vitamin D per 100 g.—G. D. S.

GALLUP, W. D., & KUHLMAN, A. H. (1942). **Sunlight in Oklahoma as an Important Factor in the Prevention of Rickets and the Maintenance of Normal Calcium and Phosphorus Metabolism.**—*Proc. Okla. Acad. Sci.* **22.** 11–15. **1959**

Calves kept in a well lighted barn and fed on rations of a low vitamin D content but adequate in respect of Ca and P developed rickets when they were 3–6 months old. Rachitic animals recovered when they were allowed outside exposure. The results indicate that solar radiation in Oklahoma is sufficiently antirachitic to protect calves against rickets provided that the animals receive adequate amounts of Ca and P in the rations.—G. D. S.

DODDS, G. S., & CAMERON, H. C. (1943). **Studies on Experimental Rickets in Rats. IV. The Relation of Rickets to Growth, with Special Reference to the Bones.**—*Amer. J. Path.* **19.** 169–185. [For previous parts, see *V. B.* **10.** 542]. **1960**

In rats in which a low-phosphorus rickets was induced the body weight was subnormal and growth of the limb bones and of the vertebral column was greatly retarded. Elongation of the shaft of the long bones ceased after three weeks, after which time elongation of the bone was due entirely to thickening of the epiphyseal cartilage. Acceleration of weight increase and of bone growth was more marked in rachitic animals treated with vitamin D than in those in which spontaneous healing took place.—A. N. W.

RASMUSSEN, R. A., SMITH, H. H., PHILLIPS, R. W., & CUNHA, T. J. (1942). **Nutritional Inadequacy of Beet Molasses Rations for Swine.**—*Bull. Utah agric. Exp. Sta.* No. 302. pp. 22. **1961**

A nutritional disease of young pigs characterized by staggering gait was produced by feeding 15% beet molasses to replace part of the grain in a barley, tankage, molasses, alfalfa, and mineral ration. Pigs weighing 20 and 50 lb. showed symptoms in about 20–30 days, but some animals did not manifest the disease until much later. Histological examination of the spinal cord and sciatic nerve of affected animals showed slight myelin degeneration and swelling, vacuolization, and fragmentation of nerve fibres. When a supplement of 5% brewer's yeast or green alfalfa was added to the diet, the disease was prevented. Pigs weighing 100 lb. or more did not develop the condition when fed on the disease-producing diet, but sows farrowed young which were affected by incoordinate gait, and mortality was high. Addition to the ration of vitamins A, D, thiamin, riboflavin, nicotinic acid, pyridoxine, and calcium pantothenate did not prevent the disorder and it is suggested that it is due to the lack of some unknown vitamin-like principle necessary in swine nutrition.

—G. D. S.

*JUSATZ. (1942). Grundlagen einer Vitaminprophylaxe bei Infektionskrankheiten. **[Basis for the Vitamin Prophylaxis of Infectious Diseases].**—*Med. Welt.* pp. 417–420. [Abst. from abst. in *Zbl. Bakt. I.* (*Ref.*). **142.** 99]. **1962**

It is stated that immunity in man is related to the intake of a good diet, particularly to a satisfactory vitamin supply. The various vitamins are differently concerned in producing immunity and the increased intake of vitamins is of no value if their absorption is impaired. Pure synthetic vitamins may also prove useless. In the course of infectious diseases there is increased consumption of vitamins, especially vitamin C. Production of antibodies against foreign protein also increases the utilization of vitamin C. Prophylactic administration of vitamins is in no way a universal preventive of all kinds of infections, but is a means of increasing the general resistance of the organism.

—A. M. COPPING.

MOORE, L. A., & SYKES, J. F. (1941). **Terminal Cerebrospinal Fluid Pressure Values in Vitamin A Deficiency.**—*Amer. J. Physiol.* **134.** 436–439. **1963**

Determinations were made of the cerebrospinal fluid pressure by puncture into the subarachnoid space of four young bovine animals which were permitted to proceed to the terminal stage of vitamin A deficiency after maintenance on a low carotene ration. Values of 400–600 mm. of saline were obtained, representing about 4–6 times the normal value. This increase in pressure was always accompanied by a marked papilloedema, incoordination, and periods of syncope. The cause of the increased cerebrospinal fluid pressure in vitamin A deficiency in the bovine is not known, but it is suggested that it may be due to a relative increase of the cranial contents caused either by bony overgrowth, or by an actual increase in the volume of the cranial contents.—R. ALLCROFT.

PAPPENHEIMER, A. M. (1943). **Muscular Disorders Associated with Deficiency of Vitamin E.**—*Physiol. Rev.* **23.** 37–50. **1964**

Recent chemical and physiological studies of muscular dystrophy due to vitamin E deficiency are discussed with reference to findings on changes in electrolyte, phosphorus, creatine, and lipin content of skeletal muscle and on changes in O_2 uptake due to deficiency. The effect of vitamin E deprivation on smooth muscle and on the nervous system is also reviewed. It is considered that while vitamin E is proved essential for normal metabolism of skeletal muscle, it has not yet been shown to be indispensable for the integrity of the nervous system.—A. M. C.

GARCIA, R. J. (1942). Avitaminosis B_1 en Rhode Island Red y Plymouth Rock Barreada. **[Avitaminosis B_1 in Rhode Island Red and Barred Plymouth Rock Fowls].**—*Rev. Med. vet., B. Aires.* **24.** 516–530. **1965**

G. produced experimental avitaminosis B_1 in R.I.R. and Plymouth Rock fowls by feeding a regulated deficient diet, a mineral supplement and vitamins A, D, and C being given.

Symptoms appeared in 11–19 days and consisted

of anorexia, lassitude, and weakness which developed into motor incoordination and paralysis of leg and neck muscles. The affected birds responded to vitamin B_1 therapy.—Miller Watson.

Lippincott, S. W., & Morris, H. P. (1942). **Pathologic Changes Associated with Riboflavin Deficiency in the Mouse.**—*J. nat. Cancer Inst.* **2.** 601–610. **1966**

Young mice fed on a synthetic diet lacking riboflavin failed to grow normally, and died within 6–8 weeks. Adults on a similar diet lost weight gradually and died within 8–10 weeks. The pathological condition was considered to be acute ariboflavinosis. Mice in this condition, if given minimal sustaining amounts of riboflavin in the diet, lived up to ten months in a state of chronic partial deficiency. Lesions were similar in genesis in the acute and chronic states, but were more marked and more frequent in the latter. They consisted of an atrophic and hyperkeratotic dermatosis followed occasionally by dermatitis, myelin degeneration in the spinal cord (chiefly in the chronic deficiency state), and keratitis. In a few cases, a capsulo-lenticular type of cataract developed.—I. W. B.

Lee, J. G., & Hogan, A. G. (1942). **Vitamins Required by Pigeons.**—*Res. Bull. Mo. agric. Exp. Sta.* No. 342. pp. 15. **1967**

In a direct continuation of earlier studies with a similar experimental procedure [see Hogan & Parrott —*V. B.* **10.** 543.], it was found that the anaemia and loss of weight which occurred in pigeons when only B_1 of the vitamin B complex was given could be counteracted by feeding (1) a fuller's earth adsorbate of tikitiki, (2) a fuller's earth adsorbate of an aqueous liver extract, and (3) a charcoal adsorbate of the filtrate from (2). These three fractions supplied all the water-soluble vitamins required by the pigeon, but a combination of any two was inadequate.

With studies involving pure B vitamins, evidence was obtained that riboflavin, B_6, and pantothenic acid, in addition to B_1, are dietary essentials. It is considered that pantothenic acid and B_6 are the major, but not the only, components of vitamins "B_2" and "B_5" respectively [see Carter & O'Brien—*V. B.* **11.** 52]. The need for nicotinic acid was not demonstrated satisfactorily, but there was definite evidence that neither choline nor inositol was required.—A. N. Worden.

Wintrobe, M. M., Mushatt, C., Miller, J. L., Jr., Kolb, L. C., Stein, H. J., & Lisco, H. (1942). **The Prevention of Sensory Neuron Degeneration in the Pig, with Special Reference to the Rôle of Various Liver Fractions.**—*J. clin. Invest.* **21.** 71–84. **1968**

The sensory neurone degeneration previously described [see *V. B.* **9.** 269, and **11.** 627.] could not be prevented by the addition to the diet of adequate amounts of vitamin B_1, riboflavin, and nicotinic acid, but did not occur when either whole dried liver or brewer's yeast was fed. Wheat germ + lucerne meal afforded some protection, as did large amounts of an antipernicious anaemia extract of liver.—A. N. Worden.

Wintrobe, M. M., Miller, M. H., Follis, R. H., Jr., Stein, H. J., Mushatt, C., & Humphreys, S. (1942). **Sensory Neuron Degeneration in Pigs. IV. Protection Afforded by Calcium Pantothenate and Pyridoxine.** —*J. Nutrit.* **24.** 345–366. [For previous parts, see *V. B.* **11.** 627]. **1969**

In previous work on degenerative changes in the nervous system in pigs, it has been shown that the lesions occurred as a result of a lack of some factor present in whole liver and brewer's yeast. It was also found that the condition developed in animals receiving optimal amounts of thiamine, riboflavin, nicotinic acid, wheat germ oil and cod liver oil. From preliminary observations it was found that when pyridoxine, pantothenic acid, and choline were added to the above factors good growth resulted. When both pantothenic acid and pyridoxine were omitted from the diet the pigs developed an abnormal gait and showed degenerative changes in the peripheral nerves, posterior root ganglia, and posterior funiculi of the spinal cord. When pantothenic acid was the only factor omitted from the diet, a subacute inflammation of the colon was found in addition to the changes in the central nervous system. When pyridoxine only was omitted, epileptiform convulsions and anaemia were observed also, in addition to the changes in the c.n.s. Both anaemia and convulsions promptly disappeared following the administration of pyridoxine. When choline was not provided in the diet, some abnormality in gait was observed. No changes in the c.n.s. were observed when thiamine was omitted from the diet. It is concluded that pyridoxine and pantothenic acid are necessary in maintaining the integrity of the c.n.s. of the pig under the conditions of the experiment. It should be noted, however, that the rate of growth of the pigs in the various groups never equalled that of comparable pigs on a well balanced diet of crude foodstuffs.—G. D. S.

Wintrobe, M. M., Stein, H. J., Miller, M. H., Follis, R. H., Jr., Najjar, V., & Humphreys, S. (1942). **A Study of Thiamine Deficiency in Swine. Together with a Comparison of Methods of Assay.**—*Johns Hopk. Hosp. Bull.* **71.** 141–162. **1970**

In a continuation of studies already published [see preceding abst.], and with essentially similar experimental procedures, both acute and relatively chronic vitamin B_1 deficiencies were produced in young pigs. The symptoms of the deficiency included inappetence, vomiting and sudden death, but poor growth was not a striking feature and locomotor abnormalities were not encountered. There did not appear to be any correlation between achlorhydria or anaemia and vitamin B_1 deficiency. Pathological studies did not reveal any nervous tissue damage, but focal necroses were present in the myocardium in five out of six cases, and are being described in a separate communication.

Chemical studies indicated that vitamin B_1 excretion (which became markedly reduced after only 19 days in the acutely deficient animals) merely reflected the immediately preceding dietary intake of the vitamin, whereas a vitamin B_1 tolerance test or estimation of the blood pyruvic acid level could be correlated with the degree of deficiency. The most useful test was a comparison of the blood pyruvic acid level before and after a standard feed of glucose.—Alastair N. Worden.

Lepkovsky, S., & Kratzer, F. H. (1942). **Pyridoxine Deficiency in Chicks.**—*J. Nutrit.* **24.** 515–521. **1971**

Experiments were done in an endeavour to observe the effects on chicks fed on a diet lacking in vitamin B_6 (pyridoxine). Wheat bran and yeast were included in the basal diet and removal of pyridoxine from these ingredients was carried out by autolysis, but this treatment also removed thiamine, riboflavin and choline which were added to the basal diet in synthetic form; in this way it was hoped to include in the basal diet all factors essential for the chick other than pyridoxine. Day-old White Leghorn chicks were fed on a standard chick mash for eight days and were then started on the experimental diets. All chicks on the B_6 deficient diet grew very slowly, while those on the diet containing 2 mg. B_6 per kg. of food grew very rapidly. All of the chicks on the basal diet alone had convulsions from which five died, but none on the diet containing pyridoxine died and none had convulsions. The chicks receiving pyridoxine appeared normal for about 17 days but subsequently the rate of growth decreased indicating

a deficiency of a factor other than pyridoxine in the diet, notwithstanding that thiamine and riboflavin had been added to the diet. No dermatitis of any kind was noted in any of the chicks on the B_6 deficient diet.—G. D. S.

BIRD, F. H., KRATZER, F. H., ASMUNDSON, V. S., & LEPKOVSKY, S. (1943). **Pyridoxine Deficiency in Turkeys.**—*Proc. Soc. exp. Biol., N.Y.* **52.** 44–45. **1972**

Newly-hatched Bronze turkey poults were provided with a vitamin B_6 deficient diet, differing from that previously given to chickens [see preceding abst.] only in that 5% each of extracted liver and of lucerne were incorporated. The deficient poults appeared weak and apathetic, but became over-excited when disturbed. In nine cases, epileptiform convulsions occurred. Death succeeded the convulsions more rapidly than in the case of chickens.

Control poults which received 3·0 mg. of vitamin B_6 per kg. of diet remained normal, and their growth rate was found to approximate 85% of that of comparable poults fed with a stock mash.—ALASTAIR N. WORDEN.

BRIGGS, G. M., Jr., MILLS, R. C., ELVEHJEM, C. A., & HART, E. B. (1942). **Nicotinic Acid in Chick Nutrition.**—*Proc. Soc. exp. Biol., N.Y.* **51.** 59–61. **1973**

Nicotinic acid deficiency is reported to have been produced satisfactorily in the young chick on a ration calculated to contain only 0·3 mg. nicotinic acid per 100 g., but otherwise adequate. Initially day-old White Leghorn chicks grew slowly when fed *ad libitum* on this ration, attaining an average weight of 106 g. at three weeks of age. Control chicks receiving supplements of nicotinic acid grew much better, the maximum effect being obtained with 1·5 mg. of crystalline nicotinic acid daily, when average weights of 164 g. were attained at three weeks.

The deficient chicks developed pathological lesions at about two weeks of age. The tip of the tongue became white and the rest of the oral cavity and also the upper portion of the crop and the oesophagus became deeply inflamed. These symptoms of "black-tongue" responded promptly to either nicotinic acid or nicotinamide.—ALASTAIR N. WORDEN.

MARTIN, G. J. (1942). **p-Aminobenzoic Acid and Sulfonamides in Rat Nutrition.**—*Proc. Soc. exp. Biol., N.Y.* **51.** 56–59. **1974**

Rats which received a basal vitamin B deficient diet with vitamins B_1, B_6, riboflavin, nicotinic acid, calcium pantothenate, choline, and inositol died after 6–7 weeks with symptoms as previously described [see *V. B.* **13.** 103.] while another group of rats, which received the additional supplement of 1 mg. of *p*-aminobenzoic acid daily, grew fairly well over a considerable period. Replacement of the *p*-aminobenzoic acid by sulphanilamide (1 mg. daily) prevented the deficiency symptoms, but did not replace *p*-aminobenzoic acid completely as a growth factor.

The addition of 0·6–2% of the intestinal antiseptic "aseptoform" to synthetic diets containing the eight B vitamins (including *p*-aminobenzoic acid) noted above, resulted in the production of a syndrome characterized by oedema of the head and by panophthalmitis: this syndrome resembled that produced by the incorporation of 0·5% sulphanilamide or sulphaguanidine in the same synthetic diet. Addition of either aseptoform or sulphonamide to a stock diet was without effect.

—ALASTAIR N. WORDEN.

MARTIN, G. J. (1942). **"Folic Acid" in Nutritional Achromotrichia.**—*Proc. Soc. exp. Biol., N.Y.* **51.** 353–355. **1975**

Young black rats receiving a basal vitamin B complex deficient diet supplemented with vitamins B_1, B_6, riboflavin, pantothenate, choline, nicotinic acid, inositol, and *p*-aminobenzoic acid, and lacking only biotin and "folic acid" showed a retarded growth rate and a high percentage mortality when 1 or 2% sulphaguanidine was added. Administration of 1μg. biotin methyl ester daily reduced these adverse effects. In all the groups of rats receiving sulphaguanidine with or without addition of biotin, a marked greying of the fur was observed at five months of age. Addition of concentrates of "folic acid" restored the growth rate to normal and cured the achromotrichia. The role of pantothenic acid and *p*-aminobenzoic acid in achromotrichia has already been described and this involvement of a third factor, *viz* "folic acid", in nutritional achromotrichia affords an explanation of discordant results reported on the effect of *p*-aminobenzoic acid. It is now suggested that *p*-aminobenzoic acid is concerned in nutritional achromotrichia only in so far as it alters the intestinal flora and thus affects the intestinal synthesis of "folic acid". It is pointed out that a great deal of evidence indicates the importance of the intestinal flora in achromotrichia.—ALISTAIR N. WORDEN.

JERVIS, G. A. (1942). **Occurrence of Brain Hemorrhages in Choline-Deficient Rats.**—*Proc. Soc. exp. Biol., N.Y.* **51.** 193–195. **1976**

Young rats which were born of mothers receiving a diet rich in cystine but low in choline appeared normal until 10–12 days of age, when they ceased to grow. About half of them died at this stage, and the remainder showed paralysis of the limbs and violent tremors of the head and body before dying 3–5 days later. Histological examinations of five animals which had manifested nervous symptoms revealed extensive cerebellar haemorrhage involving from one-third to one-half of the cerebellar laminae. Apart from small haemorrhagic foci in the grey matter of the cerebral cortex, there were no other lesions.

A brief discussion of haemorrhagic nervous lesions which have been reported in other vitamin deficiencies is included.—ALASTAIR N. WORDEN.

DAVIS, G. K., & COLE, C. L. (1943). **The Relation of Ascorbic Acid to Breeding Performance in Horses.**—*J. Anim. Sci.* **2.** 53–58. **1977**

Plasma ascorbic acid values for Belgian and Percheron mares with good breeding histories were significantly higher (0·15 mg. %) than those of mares which were difficult to get in-foal (0·07 mg. %). Corresponding values for light horse breeds were 0·129 and 0·09 mg. %. There was a wide range in the blood ascorbic acid value in individual mares of the good breeding group, and consequently it was not possible to indicate a range of values which might be considered adequate for good breeding performance. On the supposition that feed may play some part in the ascorbic acid level of the blood, determinations were made at different seasons of the year which indicated that mares going on to pasture in the spring showed a rise in blood ascorbic acid value.

Details are given regarding the improvement in sperm motility in a stallion following ascorbic acid therapy. Cessation of the administration of ascorbic acid was quickly followed by a deterioration in the sperm motility.—N. J. SCORGIE.

See also absts. **1892** (diet and immunity), **1992** (diet and liver cirrhosis), **1948** (goitrogenicity of rape seed).

PHYSIOLOGY AND ANATOMY

NICHOLES, H. J., BOYNTON, B. L., & HERRIN, R. C. (1942). **Changes in the Creatinine Clearance and Urine Flow of the Dog during Fever.**—*J. Lab. clin. Med.* **27.** 1306–1316. **1978**

High-frequency electromagnetic induction caused a rapid and continuous elevation of rectal temperature and vigorous panting respirations in non-anaesthetized bitches which were subjected to experiment while in the postabsorptive condition, *i.e.* 16–24 hours after the last meal. The average increase in temperature was 1·0°F., when heat was induced in the head, 1·9°F. when induced in the kidney region, and 3·1°F. when induced in the pelvic region. Hyperthermia and panting lasted for 20–70 min. During the period of hyperthermia, there was usually creatinine clearance; the average decrease was greatest (27%) when heat was induced in the kidney region. The effect was almost abolished in animals in which the splanchnic nerves had been sectioned and lumbar sympathectomy carried out.

Experiments in which pyrexia was induced by intravenous injection of typhoid-paratyphoid vaccine did not as a rule lead to a decrease in plasma creatinine clearance, and in many cases a reverse effect was noted, while an increase in the clearance resulted in two animals in which hyperthermia was induced by exposure to a current of cold air.—ALASTAIR N. WORDEN.

*HUBACEK, O. (1940). Erythrocytengrösse der Haussäuger (Erythrocytometerbestimmungen). **[Size of Erythrocytes in Domestic Mammals].**—*Inaug. Diss., Vienna.* pp. 16. [Abst. from abst. in *Jber. Vet.-Med.* **70.** 1]. **1979**

The average size of the red cells was determined for the following animals :– foals up to one year old 5·3–5·4μ; horse 5·6μ; calves up to one year 5·2μ; cattle 5·6–5·7μ; goats 4·5μ; sheep 5·1μ; cats 5·6–5·7μ; pigs 6·0–6·2μ; rabbits 6·0–6·8μ; dogs 6·0–6·8μ. Age, sex, weight, pregnancy, oestrus, or anaemia due to worms had no effect on the size. Two cases of infectious anaemia in horses showed a significant increase in erythrocyte size.—J. G. CARR.

MUNDHENK, R. L. (1941). **A Study of the Normal Adult Canine Hemogram.**—*N. Amer. Vet.* **22.** 95–100. **1980**

M. examined 200 dogs at Auburn, Alabama, and found that the following were the figures of the average blood picture :– haemoglobin 40–100% (average 84·2%); red corpuscle diameter, dry 5·49–9·07μ (average 7·5μ) and wet 6·15–9·1μ (average 8·63μ); erythrocyte count 2,440,000–11,016,000 (average 6,042,520). Males had a higher average count than females—6,412,000 and 5,570,000 respectively. [Some of the minimal figures were obtained from parasitized dogs and ought perhaps to have been excluded.] The article is a good guide to haematological tests which can be made by clinicians. —J. E.

JONES, E. R. (1943). **Chemical Composition of the Blood of Ankole and Zebu Cattle in Uganda.**—*Vet. Rec.* **55.** 128–129. **1981**

The chemical composition is given of the blood of 41 healthy Ankole and zebu cattle and of 30 experimental Ankole and zebu cattle which were clinically quite healthy but had been used for some time previously for the manufacture of rinderpest serum. The results are analysed statistically and the only differences noted between the experimental group and the other native cattle were in the glucose, chlorides, amino-nitrogen, uric acid, and magnesium content. No appreciable differences were observed between the blood of Ankole and zebu cattle and that of other breeds except that the native cattle had higher erythrocyte counts.—G. D. S.

REGÖS, J. (1940). Ueber den Diastasegehalt des Pferde- und Rinderblutplasmas. **[Diastase Content of Equine and Bovine Blood Plasma].**—*Thesis, Budapest.* [Abst. from abst. in *Berl. Münch. tierärztl. Wschr.* Nov. 28th. 586. (1941)]. **1981a**

By the method of Chrometzka and Erlemann, the diastase content of normal horse plasma was 66–99 (average 80) mg. % and that of normal bovine plasma 50–91 (average 63) mg. %.

SYKES, J. F., & MOORE, L. A. (1942). **The Normal Cerebrospinal Fluid Pressure and a Method for its Determination in Cattle.**—*Amer. J. vet. Res.* **3.** 364–367. **1982**

The c.s.f. pressure was recorded in the standing position, without anaesthesia. A 16-gauge hypodermic needle (75–100 mm. in length) was inserted through the dorsal opening of the atlanto-occipital articulation, the point of insertion through the skin being 2–3 in. posterior to the attachment of the ligamentum nuchae and in line with the anterior prominences of the atlas. The stylet was then withdrawn, and the needle connected with rubber tubing leading to a manometer of 2 mm. bore, both tubing and manometer being filled before attachment with 0·85% saline.

In 21 cattle, ranging from 30–700 days of age, the values recorded were :– range 80–150 mm.; mean, 105 mm. There were no apparent age differences within the group employed.—ALASTAIR N. WORDEN.

PHILLIPSON, A. T. (1942). **The Fluctuation of pH and Organic Acids in the Rumen of the Sheep.**—*J. exp. Biol.* **19.** 186–198. **1983**

The experiments were done on six sheep provided with permanent rumen fistulae. The pH of the ingesta varied in a regular manner in direct relation to feeding. When the diet consisted of bran and oats with chaffed straw and hay the pH varied between 7·0 and 5·9 while the volatile acids varied on an average between 65 and 119 ml. of 0·1 N acid per 100 ml. of the rumen liquid squeezed from the rumen ingesta. Similar variations were found when mangolds and chopped cabbage were substituted for bran and oats except that the peak of the volatile acids and the lowest point of pH occurred earlier; this was associated with the transitory appearance of lactic acid in the ingesta immediately after feeding. When hay alone was fed the fluctuations in acidity were less and the peak was delayed; volatile acids varied between 58 and 94 ml. of 0·1 N acid % and the pH between 6·8 and 6·5. When the sheep were grazing the acidity of the rumen was greater than on any other diet; volatile acids varied between 119 and 162 ml. 0·1 N acid% of the rumen liquid and the pH between 6·4 and 5·8.—A. T. PHILLIPSON.

PHILLIPSON, A. T., & MCANALLY, R. A. (1942). **Studies on the Fate of Carbohydrates in the Rumen of the Sheep.**—*J. exp. Biol.* **19.** 199–214. **1983a**

Glucose, fructose, and cane sugar are rapidly fermented when introduced into the rumen, the pH of the ingesta falls abruptly and lactic acid accumulates; this acid does not persist but disappears within a few hours and its disappearance is accompanied by an increase in total volatile acids. Maltose, lactose, and galactose do not produce such a rapid fermentation, the fall in pH is slow, and no lactic acid appears, while the increase in volatile acids is reciprocal to the fall in pH. Starch and cellulose both produce a rise in volatile acids, but this is also slow and the fall in pH, if it occurs, is insignificant.

The speed with which glucose disappears from the rumen was estimated after the administration of 100 g. into the rumen; none was left after 2½ hours, while the quantity appearing in the abomasal ingesta was small. Similarly when lactate was introduced into the rumen, the rate of disappearance was rapid and the quantity passing to the abomasum was small. *In vitro* experiments with both glucose and lactate showed that both these substances are rapidly fermented and that the end products are volatile acids, while lactate appears as an intermediary stage from glucose. The quantity of lactate which disappeared was similar in quantity to the amount of volatile acid formed.

The quantity of volatile acid in the abomasal ingesta is small and the increase after feeding negligible; in addition, the introduction of the sodium salts of acetate or butyrate does not produce any increase in the volatile acids in the abomasum even though the concentration of volatile acid in the rumen falls rapidly to the pre-dosing level. *In vitro* incubation of acetate, propionate, and butyrate showed that the acid radicle is stable in rumen ingesta and the conclusion is drawn that absorption of volatile acid must occur from either or both the rumen and omasum.—A. T. PHILLIPSON.

MCANALLY, R. A. (1942). **Digestion of Straw by the Ruminant.**—*Biochem. J.* **36.** 392–399. **1983b**

Digestion was studied *in vitro* by suspending straw, enclosed in silk bags, in the rumen ingesta through a rumen fistula. Maximum digestion amounted to 50% of the straw by weight and this was achieved after five days' exposure to rumen ingesta. Up to 40% of the fibre in the faeces of sheep fed upon straw was digestible when suspended in the rumen, but of the individual constituents of straw, isolated cellulose and hemicellulose were from 90–100% digestible in the rumen while some loss of lignin was found. A comparison of the rate of digestion of isolated cellulose and of the cellulose of straw suggests that 25% of straw cellulose is in the "isolated" condition, while the remainder is digested more slowly. Faecal fibre contains a "core" of cellulose, amounting to 35% of the whole, which is completely indigestible even on prolonged exposure to rumen ingesta.

The residue of straw after treatment with 1·5% NaOH is from 80–90% digestible. This increase is due not only to greater digestion of cellulose but also to greater digestion of the other fractions. Even so the faecal residue of sheep fed upon straw pulp was still 30% digestible when the latter was suspended in the rumen. The conclusion is drawn that the passage of food through the alimentary tract of the ruminant is too rapid for complete digestion to occur of the available material of straw and straw pulp.—A. T. PHILLIPSON.

*KORCHMAROS, P. (1941). **[Chlorine Content of the Stomach Wall of the Pig].**—*Inaug. Diss., Budapest.* pp. 16. [Abst. from abst. in *Jber. Vet.-Med.* **69.** 245]. **1984**

The chlorine content of various parts of the porcine stomach wall was determined. The highest concentration was found in the mucous membrane of the cardia, where it averaged 8·7 mg. %, being lowest in the diverticula. The muscular part of the wall contained 1–1·5 mg. % less than the mucous membrane. In the case of the small intestine there was no significant difference in chlorine content between mucosa and muscular layer, despite the higher dry-matter content of the muscle.—ALASTAIR N. WORDEN.

CLARK, E. R., & CLARK, E. L. (1942). **Microscopic Observations on New Formation of Cartilage and Bone in the Living Mammal.**—*Amer. J. Anat.* **70.** 167–200. **1985**

The formation of cartilage was observed microscopically in living rabbits by means of transparent chambers inserted into the ear. Cartilage appeared only after some weeks or even months and was not observed under the conditions of mild inflammation which favoured rapid growth of other tissues such as blood vessels, lymphatics, connective tissue, and nerves. After a few weeks of slow increase in amount, growth of cartilage ceased for several months and in some animals it then decreased in amount or even disappeared.

The new cartilage arose from elongated motile cells containing uniformly distributed granules: these cells became stationary and spherical, the granules coalesced to form large fat droplets, and a homogeneous matrix appeared between the cells. Mitotic division of the new cartilage cells was not observed. The origin of the precursor wandering cells is not known; they may have migrated from the original cartilage or perichondrium or they may have been ordinary fibroblasts originating from connective tissue cells. The appearance of isolated foci of new cartilage in the chamber suggests a localized chemical change as the stimulus to cartilage formation.

Spontaneous development of bone from the newly formed cartilage was occasionally seen and in one case the cytological details were observed.

Cartilage developed in the interstices of circulating vascular networks, and after the formation of the intercellular cartilage matrix, these vessels contracted and the cartilage became non-vascular. New bone was formed within the areas of cartilage and was subsequently invaded by capillaries which grew in over the cartilage, and bone growth and bone resorption occurred simultaneously.—E. G. WHITE.

WARREN, D. C., & GISH, C. L. (1943). **The Value of Artificial Insemination in Poultry Breeding Work.**—*Poult. Sci.* **22.** 108–117. **1986**

The general application of artificial insemination to poultry breeding is discussed in the light of certain experimental work carried out by the authors. The influence of the time interval between inseminations of hens by two different males was studied; it was found that about seven days should be allowed to elapse between inseminations by the two males if certainty was to be obtained in regard to the paternity of the chicks. Experiments with stored semen gave the following fertility results:– freshly collected semen, 73%; semen stored for five hours, 66%; semen stored for 24 hours, 6%. The optimum storage temperature was 50°F. The highest fertility was obtained from inseminations made immediately after laying, this being the time when the next egg to be laid has not yet entered the oviduct. For the highest fertility it is suggested that inseminations should be made twice weekly.

—N. J. SCORGIE.

MCCLEAN, D., & ROWLANDS, I. W. (1942). **Role of Hyaluronidase in Fertilization.**—*Nature, Lond.* **150.** 627–628. **1987**

Since it had been demonstrated [see *V. B.* **11.** 616.] that aqueous extracts of mammalian testis and many species of invasive bacteria as well as snake, spider, and leech venoms contain a spreading factor, *viz*, hyaluronidase which hydrolyses the hyaluronic acid of the synovial fluid, vitreous humour, umbilical cord and skin and thus increases the permeability, the role of the hyaluronidase of spermatozoa in fertilization was investigated. Ovulation was produced in immature rats, the eggs were removed from the Fallopian tube and the action of hyaluronidase from various sources was studied on the gel and cell masses surrounding the ova. The action of the hyaluronidase appeared to be solely

one of liquefaction of the gel, thus causing the cells to fall away from the ovum. The rate at which the cumulus cells were dispersed was closely correlated with the concentration of hyaluronidase obtained not only from spermatozoa and testis, but also from streptococcus, *Clostridium welchii*, and *Cl. septicum*.

The absence of any action of vesicular and prostatic secretions on the gel indicates that the hyaluronidase content of semen is of testicular origin. This action suggests an explanation of why such enormous numbers of sperm are produced for the fertilization of the mammalian ovum, since a large number may be required in the vicinity of the egg to produce a concentration of hyaluronidase sufficient to liquefy the hyaluronic acid gel and so allow the penetration of the egg by the single effective sperm.—R. ALLCROFT.

*AJELLO, P. (1941). Le modificazioni vaginali nella bovina in correlazioni all'attività ormonale ovarica. **[Vaginal Changes of Cattle in Relation to Ovarian Hormone Activity].**—*Nuovo Ercol.* **46.** 253–273. [Abst. from abst. in *Jber. Vet.-Med.* **69.** 474]. **1988**

Histological examinations were made of the mucous membrane of the vagina of ten bovines taken between the upper and middle third of the organ in various stages of the cycle. Epithelial proliferation, congestion, and numerous histiocytes in the propria were observed during the follicle stage in the ovaries in six cows with normal cycles. These tissue appearances persisted until the beginning of the corpus luteum stage and gradually disappeared towards the end of the stage. Corresponding changes were observed in four cows affected with hyper- and hyposecretion of the follicular hormone. Eight photomicrographs are given.—A. MOLDAWSKY.

See also absts. **1943** (ruminant digestion), **1946**, **1953**, **1977** (fertility), **2016** (thyroid therapy), **2017–2019** (hormone therapy).

POISONS AND POISONING

*KINSLEY, C. G. (1942). Thalliumforgiftung hos Hunde. **[Thallium Poisoning in a Dog].**—*Maanedsskr. Dyrlaeger.* p. 521. [Abst. from abst. in *Skand. VetTidskr.* **32.** 584–588]. **1989**

A case record of a dog which died from poisoning by thallium sulphate laid as a rat poison. Symptoms included anorexia, vomiting, weakness, dry stiff skin, reddened conjunctiva, dry parchment-like nose, and diarrhoea.

PORLEY, C. M. F. (1942). El ácido cianhídrico en las tortas de lino. **[HCN in Linseed Cakes].**—*Bol. mens. Direcc. Ganad., Montevideo.* **26.** 4–17. **1990**

P. did considerable work on the estimation of HCN in linseed meal and cakes. He concludes that Guignard's reaction gives accurate results only in the presence of emulsin. He recommends adding 1% emulsin to promote hydrolysis. A colorimetric method for estimation of HCN is described.—MILLER WATSON.

WINTERHALTER, M. (1942). Ein Beitrag zur Wirkung des Tetrachlorkohlenstoffes beim Schaf. **[Action of Carbon Tetrachloride in Sheep].**—*Tierärztl. Rdsch.* **48.** 315–318. **1991**

The action of carbon tetrachloride on the liver of sheep was studied by giving each of a group of ten animals two proprietary capsules sold for the treatment of fascioliasis. The two capsules contained a total of 2·7 ml. of CCl_4 in an inert vehicle. The animals were kept without food or water for 24 hours prior to dosing and were slaughtered 1–10 days later.

After 24 hours there was necrobiosis of the liver cells around the central lobular veins, followed at 48 hours by necrosis and a haemorrhagic inflammatory reaction. From the third day the inflammatory reaction gradually subsided and regeneration was marked from the third day. By the end of the eighth day the liver was normal. The sequence of changes and their time relations are thus very similar to those observed in the rat, rabbit, and pig. In the sheep, however, fatty changes and the presence of pigment granules were not observed and the liver changes were inflammatory rather than degenerative in character once the necrobiotic changes had occurred around the central lobular veins 24 hours after administration of the drug.

—E. G. WHITE.

POST, J., EARLE, D. P., Jr., PATEK, A. J., Jr., & VICTOR, J. (1942). **Effects of Yeast and Food Intake on Experimental Carbon Tetrachloride Cirrhosis of the Liver in the Rat.**—*Amer. J. Path.* **18.** 661–673. **1992**

The isocaloric replacement of casein and sucrose by up to 10% of brewer's yeast in the diet of rats tended to counteract the depression of growth, but not the development of hepatic lesions in rats which were injected twice weekly with a 50% solution of CCl_4 in mineral oil at a level of 0·05 ml. per 100 g. body weight. Increased food consumption (14 g. as opposed to 8–11 g. daily) did appear to modify the severity of the cirrhosis, independently of the yeast intake.—A. N. W.

See also abst. **1948** (goitrogenicity of rape seed).

THERAPEUTICS AND DISINFECTION

MILLER, B. F., ABRAMS, R., DORFMAN, A., & KLEIN, M. (1942). **Antibacterial Properties of Protamine and Histone.**—*Science.* **96.** 428–430. **1993**

It is known that some antibacterial substances such as gramicidin and anionic detergents attack with almost complete selectivity only Gram-positive organisms. It was thought that the inactivity of these substances on Gram-negative organisms may be due to the phospholipids present in these organisms and that precipitation of these phospholipids by basic proteins such as protamine or histone might cause these Gram-negative organisms to become susceptible to some selective inhibiters. Experiments on *Bacterium coli* showed that when protamine was mixed with either Tergitol-7 (a typical anionic detergent), tyrothricin or Hoogerheide's compound [see MCDONALD—*V. B.* **13.** 225.], respiration was completely inhibited, but each antibacterial substance alone did not affect the respiration of the organism. Protamine and histone alone were also found to exert a powerful inhibitory action on the respiration or anaerobic metabolism of a number of species of both Gram-negative and Gram-positive organisms, protamine being most active at an alkaline pH and histone at an acid pH. These results suggest that it may be possible by means of a protamine to "sensitize" Gram-negative organisms to compounds which ordinarily act only on Gram-positive species and that the antibacterial properties of the protamines and histones and their products of partial hydrolysis are worth further investigation.—R. ALLCROFT.

TIMONIN, M. I. (1942). **Another Mould with Anti-Bacterial Ability.**—*Science.* **96.** 494. **1994**

A culture of *Aspergillus* sp. of the *Candidus* group exhibited antibacterial properties and gave a positive reaction for the presence of citrinin. Compared with OXFORD's data on citrinin [see *V. B.* **12.** 308.], the bacteriostatic power of this substance in purified or crude state appeared stronger. The growth of *Staphylococcus aureus* in nutrient or 1% glucose broth was completely inhibited in a dilution of 1 : 64,000, of *Staph. albus* in 1 : 128,000, and of *Bacillus mycoides* in 1 : 128,000; partial inhibition of these organisms was given by a dilution of 1 : 1,024,000. Bactericidal action on *Staph. aureus* and *albus* was exhibited by 125 g. per ml. Autoclaving for 30 min. at 15 lb. pressure did not reduce the bacteriostatic power of the substance.—R. A.

SMITH, M. I., ROSENTHAL, S. M., & JACKSON, E. L. (1942). **The Chemotherapeutic Action of a N-Phosphoryl Derivative of 4-4′-Diaminodiphenylsulfone.**—*Publ. Hlth Rep., Wash.* **57.** 1534–1542. [Authors' summary copied *verbatim*]. **1995**

The pharmacologic action and chemotherapeutic activity of a N-phosphoryl derivative of 4-4′-diaminodiphenylsulfone have been studied. Its toxicity is from one-half to one-fifth that of its parent substance. Its chemotherapeutic activity against streptococci is of about the same order as that of its parent substance.

When administered parenterally under the conditions of our experiments, this compound exhibited a curative action in experimental pneumococcus infections in mice that could not be demonstrated with the parent sulfone; the results obtained compared favorably with those from sulfadiazine and sodium sulfadiazine.

MUDD, S. (1943). **Changes in the Bacterial Cell Brought about by the Action of Germicides and Antibacterial Substances as Demonstrated by the Electron Microscope.**—*Amer. J. publ. Hlth.* **33.** 167–168. **1996**

Electron micrographs show that after brief exposure to the salts of silver, lead, mercury or nickel the bacterial inner protoplasm, but not the cell walls, was selectively darkened; shrinkage, coagulation, or escape of protoplasm from the injured cells was sometimes observed. The deposition of *Salmonella typhi* flagella and sometimes of immune bodies was also studied and the film thickness measured. Electron photomicrographs of the capsular swelling of pneumococci after exposure to homologous rabbit antiserum were compatible with the interpretation that the polysaccharide molecules of the capsule form a gel into whose interstices the antiserum molecules penetrate; the capsules increase in size and density in consequence of this impregnation.—J. F.

GOULD, G. N. (1943). **The Application of Sulphonamides in Veterinary Practice.**—*Vet. Rec.* **55.** 107–108. **1997**

This is a discussion on the applications of some of the common sulphonamides in veterinary practice. Doses are given usually on a body-weight basis. G. refers among other things to the successful treatment of strangles with sulphanilamide, joint-ill of foals and calves with sulphapyridine, white scour in calves and cramp in pigs with sulphanilamide, and swine influenza with sulphapyridine. Sulphanilamide by topical application has been found of value as a wound dressing in many types of wounds, also in otorrhoea in dogs, in teat eruptions and cow pox. In metritis in cows, and following late removal of the placenta, pessaries containing sulphanilamide and sulphapyridine in the proportion of 3 : 1 have been found useful.

In mastitis due to *Streptococcus agalactiae*, G. claims consistent results with sulphanilamide in acute and subacute cases. In *Str. dysgalactiae* infection, results are less good.

Neither sulphanilamide nor sulphapyridine was found of value in either staphylococcal mastitis or mastitis due to *Corynebacterium pyogenes*. G. found that soluble derivatives of sulphanilamide injected into the udder proved successful in cases which had failed to respond to acriflavine. The preparations used were soluseptasine [disodium *p*-(γ-phenylpropylamino) benzene sulphonamido α-γ-disulphonate] 8% solution, sulphacetamide (soluble) 10% solution, sulphonamide E.O.S. [sodium sulphanilamide N-ethyl sulphonate] 5–10% solutions, and sulphanilamide L.S.F. [sulphanilamide lactoside sodium formaldehyde sulphoxylate.] The last preparation was found of value in mastitis due to *Str. dysgalactiae* following the oral administration of sulphanilamide.—M. H. WEDDELL.

KHUEN, E. C. (1943). **The Effect of Sulfonamides on the Urinary Tract in Small Animals.**—*N. Amer. Vet.* **24.** 30–33. **1998**

This is a general discussion based on published work. No new facts are given.—J. A. GRIFFITHS.

I. FELDMAN, W. H., HINSHAW, H. C., & MOSES, H. E. (1942). **Promin in Experimental Tuberculosis. Sodium P,P′-Diaminodiphenylsulfone-N,N′-Didextrose Sulfonate.**—*Amer. Rev. Tuberc.* **45.** 303–333. [Spanish summary]. **1999**

II. FELDMAN, W. H., MANN, F. C., & HINSHAW, H. C. (1942). **Promin in Experimental Tuberculosis. Observations on Tuberculous Guinea Pigs before and after Treatment with Sodium P,P′-Diaminodiphenylsulfone-N,N′-Didextrose Sulfonate (Promin).**—*Ibid.* **46.** 187–195. [Spanish summary]. **2000**

III. BARACH, A. L., MOLOMUT, N., & SOROKA, M. (1942). **Inhalation of Nebulized Promin in Experimental Tuberculosis. Sodium P,P′-Diaminodiphenylsulfone-N,N′-Didextrose Sulfonate.**—*Ibid.* 268–276. [Spanish summary]. **2001**

I. The effect of "promin" on experimental TB. in g. pigs was investigated, the drug being administered orally with the food which contained 1% promin by weight, *i.e.* a dose of 30–40 mg. per day. Promin treatment, commenced two days before infection with virulent bacilli, was found to prolong the lives of the treated g. pigs: only six (20%) of these animals had succumbed when the last of 20 control g. pigs died 82 days after infection. At P.M. examination, fewer situations were affected and fewer and smaller lesions were present in the treated group than in the controls.

In a second experiment, 80 g. pigs were divided into groups and oral administration of promin was commenced at times varying between one day and six weeks after infection with virulent organisms. Even when the drug treatment did not commence till six weeks after infection, the extent of the disease was profoundly reduced as compared with that in untreated controls and in some of the treated animals no tuberculous lesions were found at autopsy.

II. In this experiment, objective proof of the existence of established lesions at the same time treatment commenced was obtained by biopsy, laparotomy being performed on the treated g. pigs, and liver specimens obtained for examination. Recovery from the operative procedure was in most cases uneventful. Promin treatment was not started until 42 days after infection, and seven days later laparotomy was performed on all the treated group and on about half the controls. The biopsy determinations indicated definitely that tuberculous lesions were present in the livers of both treated and untreated animals at the time drug administration began. These findings were compared

eventually with the findings on tissues secured at necropsy, the experiment being continued till the last of the controls died 224 days after infection. At this time only three (19%) of the treated animals were dead. At P.M. examination lesions of TB. were present in every animal in the untreated group, while six (38%) of the treated group were without gross or microscopic signs of TB.

III. After a preliminary experiment confirming that promin, administered by mouth, produced a definite inhibition of the development of generalized TB. in g. pigs, the authors attempted to produce a high drug concentration in the lungs coupled with a low blood concentration by administering promin as an inhalation in the form of a nebulized spray. The degree of pulmonary as well as of generalized tuberculous lesions was found to be considerably less in infected g. pigs treated by the inhalation method, despite much lower blood promin levels, than in animals fed the same amount of drug by mouth.—J. LOCHIEL MCGIRR.

CALLOMON, F. F. T. (1943). **New Derivatives of Diaminodiphenylsulfone. Their Therapeutic Effect in Experimental Tuberculosis of Guinea Pigs.**—*Amer. Rev. Tuberc.* **47.** 97–106. [Spanish summary]. **2002**

The effectiveness of the sulphonamide compounds sulphanilamide, sulphapyridine, sulphathiazole, and sulphathiazoline in experimental TB. in g. pigs was compared with that of three diaminosulphone derivatives. These were (1) promin, *i.e.* sodium-*p*-*p*′-diaminodiphenylsulphone-N-N′-didextrose-sulphonate, (2) compound no. 2398, *i.e.* disodium-formaldehyde-sulphoxylate-diaminodiphenylsulphone, and (3) compound no. 2816, *i.e.* 4(α-pyridil-N-sulphonamide)-phenyl-2-azo-8-amino-1-naphthol-5,7-disulphonic acid. Treatment of the g. pigs was commenced three days after infection with virulent bacilli and continued for four weeks. For the first week the drugs were administered orally twice daily in a dosage of 0·5 g. per kg. body weight, and thereafter the dose was reduced to 0·3 g. per kg. body weight: the only exception was compound 2816 which was employed in the smaller dosage of 0·15 g. per kg. body weight throughout the experiment.

Under the conditions employed, the three diaminosulphone derivatives produced evident inhibition of the development of TB. while the sulphonamides showed no appreciable effects. On the histological evidence, promin produced the most favourable results but, with the dosage employed, it also produced the highest mortality. Compound 2398 gave almost as good results histologically and showed the lowest mortality rate of the three compounds. Compound 2816 produced histological results similar to those of compound 2398, but with mortality figures almost as great as those with promin, even though given in smaller dosage. The prophylactic administration of the three compounds did not enhance their effectiveness. These results appear to indicate compound 2398 as the most encouraging substance for further study.—J. LOCHIEL MCGIRR.

REITLER, R., & MARBERG, K. (1943). **The Bactericidal Effect of Tin and its Application to the Treatment of Typhoid Fever.**—*Trans. R. Soc. trop. Med. Hyg.* **36.** 305–318. **2003**

The effect of tin upon various bacteria suspended in Ringer's solution was studied. No effect was observed upon enterococci, *Salmonella enteritidis*, *Pseudomonas pyocyanea*, *Proteus vulgaris*, and *Bacterium shigae*. All the other organisms tested (*Pasteurella pestis*, *Salmonella typhi*, *S. paratyphi* A, *Staphylococcus aureus*, *Bact. flexneri*, *Bact. coli*, *Brucella melitensis*, *S. paratyphi* B) were gradually reduced in number compared with the controls and were eventually destroyed completely after various periods of contact with the metal. The time required to sterilize ranged from 2–10 days at 37°C.

On these results it was decided to treat clinical cases of typhoid fever with tablets containing a mixture of colloidal metallic tin and tin stearate. The death rate in 100 selected severe cases was 3% and in 428 controls, including mild cases, it was 8·2%. These effects are attributed to the coincidence that drug and causative organism have a common place of accumulation, namely the intestinal lymph nodes.—A. R. MARTIN.

FARQUHARSON, J. (1942). **The Use of Sulfonamides in the Treatment of Calf Diphtheria.**—*J. Amer. vet. med. Ass.* **101.** 88–93. **2004**

The treatment of 76 cases of "calf diphtheria" (*Actinomyces necrophorus* infection) with sulphonamides is detailed and the results are tabulated.

The first eight cases were treated with sulphanilamide and five recovered (62·5%). Forty-one were given sulphapyridine sodium and 40 recovered (97·56%). Nine received sulphapyridine sodium and sulphapyridine, 14 sulphathiazole sodium, two sulphathiazole sodium and sulphathiazole, and two sulphapyridine, with 100% recoveries.

It is stated that a single dose of sulphapyridine is sufficient to cure the majority of cases, but it is recommended that the use of sulphapyridine should be continued for two days. Sulphathiazole appears to be slightly less efficient as it is eliminated more quickly, and more cases relapsed after a single dose than was the case with sulphapyridine.—J. A. GRIFFITHS.

LANK, R. B. (1942). **Sulfapyridine Therapy in Calf Diphtheria.**—*Vet. Med.* **37.** 484–485. **2005**

A brief discussion of the aetiology of "calf diphtheria" is given, and the favourable result obtained in the treatment of one calf with sulphapyridine is recorded.—A. R. MARTIN.

BRIDGEMAN, M. (1943). **Treatment of Ringworm by the Hypo-Hcl Method.**—*J. R. Army vet. Cps.* **14.** 81–82. **2006**

It is stated that a cure of ringworm in two horses was obtained in three days after a single treatment, and that two other horses were cured after two treatments. Even so B. does not consider that the treatment is better than that usually employed for ringworm.—J. A. G.

KIRK, R. (1942). **Some new British Synthetic Drugs in the Chemotherapy of Protozoal Infections.**—*E. Afr. med. J.* **19.** 219–223. **2007**

K. briefly reviews the history of the development of the diamidine series of drugs, including pentamidine, propamidine, stilbamidine, etc., from the recognition in 1937 of their chemotherapeutic activity in experimental infections to their present extensive use in the field in the treatment of sleeping sickness and kala-azar in man, and of *Babesia* infections in domestic animals [see also *V.B.* **12.** 431].—D. G. DAVEY.

PECK, E. F. (1943). **The Use of Antimosan Against Trypanosoma evansi Infection in the One-Humped Camel.**—*Vet. Rec.* **55.** 110–111. **2008**

Antimosan was given subcutaneously, in single doses of 40–60 ml., to six camels infected with *T. evansi*. The drug seems to have caused the disappearance of trypanosomes from the blood, but because the animals did not improve "as much as one would have expected, considering the available grazing", and because Bennett's test remained positive at the end of the treatment in five of the camels, P. concludes that these single injections of antimosan did not cure the infection.
—D. G. DAVEY.

*DE BORCHGRAVE, O. (1941). Action du "chinosol" (sunoxol) et d'autres produits pharmaceutiques sur

"Trypanosoma gambiense" et sa parasitose chez le cobaye. [**Action of Chinosol (Sunoxol) and Other Compounds on *T. gambiense* and on Infected G. Pigs**]. —*Rev. belge Sci. méd.* **13.** 356–365. [Abst. from abst. in *Jber. Vet.-Med.* **70.** 45]. **2009**

G. pig blood containing *T. gambiense* is rendered uninfective if chinosol 1 : 1,000 is added to it, 5 min. before its use for inoculation. Plasmochin, yatren, quinine hydrochloride, argoflavine, atebrin, astreptin [sulphanilamide], "nipagin", and carbolic acid have the same action. Chinosol is not effective either as a curative or as a prophylactic for trypanosomiasis, but it is suggested that in view of its low toxicity it may be of value as a means of removing trypanosomes from blood to be inoculated into animals, for example when virulent blood is used for immunizing against rinderpest. —U. F. Richardson.

Horton-Smith, C., & Taylor, E. L. (1943). **Saturated Solution of Sulphamethazine as a Substitute for Drinking Water in the Treatment of Caecal Coccidiosis in Chickens—a Preliminary Note.**—*Vet. Rec.* **55.** 109–110. **2010**

The results recorded in these experiments compare favourably with those obtained when sulphamethazine was administered in the food to chicks infected with coccidiosis [see *V.B.* **13.** 187]. Complete protection against acute coccidiosis was obtained when access to the saturated solution of sulphamethazine was delayed for as long as 72 hours after the administration of massive doses of oocysts, and almost complete protection when the interval between infection and treatment was 96 hours. The most interesting feature of the experiments was the attempt to control an experimental epidemic of coccidiosis with sulphamethazine in the drinking water. More than 150 birds were infected with oocysts, and treatment (half were treated, half kept as controls) was delayed until deaths from coccidiosis had commenced to occur. Of the control birds, 55% died from acute caecal coccidiosis, while only 10% of the treated birds succumbed to it. [The name sulphamethazine for the drug used in these experiments has now been changed to sulphamezathine.]—D. G. D.

Finney, D. J. (1942). **Examples of the Planning and Interpretation of Toxicity Tests Involving more than one Factor.**—*Ann. appl. Biol.* **29.** 330–332. **2011**

In designing toxicity tests of insecticides, F. stresses the advantages of employing a factorial arrangement of treatments, including all possible combinations of several levels of each of the factors to be tested. The discussion is illustrated by reference to experiments performed by himself and other workers.

In a statistical analysis of experiments to compare the mortality of *Tribolium confusum* due to pyrethrins in oil, it was found that the spray technique gave a higher mortality than the film technique. The difference, which was small, was constant for all concentrations and deposits tested.—W. Moore.

Howell, C. E., & Britton, J. W. (1943). **Seasonal Anthelmintic Treatment of Horses.**—*Vet. Med.* **38.** 8–11. **2012**

As a result of their experience at the University of California horse ranch, the authors make various recommendations for the control of strongylosis in horses. In summary form these recommendations are as follows. (1) Brood mares should be treated shortly after foaling with small repeated doses of phenothiazine, say 5 g. morning and night for three days, and the course of treatment repeated after 4–5 months. (2) Foals should be treated first at weaning time (7–8 months of age), and again when they are 11–14 months of age, with small repeated doses of phenothiazine. (3) Horses 1–4 years of age should be treated in July, December, and April of each year. (4) Horses 5–10 years of age should be treated in July and January of each year. (5) Horses over ten years of age should be treated in July or August of each year.—D. G. Davey.

Whitlock, J. H. (1942). **Field Test of Various Anthelmintics Used for the Treatment of Haemonchosis.** —*Amer. J. vet. Res.* **3.** 386–391. **2013**

It is pointed out that there is a great variation in the price of the various copper salts and mixtures of copper salts recommended for use as anthelmintics in sheep. For example, copper sulphate or copper sulphate + nicotine sulphate is cheap, whereas the addition of copper formate, copper arsenate, or kamala makes the preparation much more expensive. Experiments were done on flocks of sheep naturally infected with *H. contortus*, to determine whether there is any justification for administering the more complicated and more expensive Cu preparations. No evidence was found that mixture of $CuSO_4$ with any of the commonly used substances enhances its action in chronic haemonchosis (defined as an infection which produces more than 2,000 eggs per g. of faeces without causing symptoms of acute disease). Consequently, $CuSO_4$ at a dose level of 1 ml. of a 10% solution per 10 lb. body weight is recommended for routine monthly prophylaxis. Its action, however, is not sufficiently certain in cases of acute haemonchosis, and for this purpose phenothiazine is advised.—D. G. Davey.

Pegreffi, G. (1939). L'uso di alcuni cloroderivati degli idrocarburi (tetracloruro di carbonio ed esacloretano) nella cura della distomatosi epatica. [**Treatment of Liver Fluke Disease by Carbon Tetrachloride and Hexachlorethane**].—*Clin. vet., Milano.* **62.** 113–120 & 172–178. **2014**

P. concludes that both carbon tetrachloride and hexachlorethane are very effective in destroying adult *Fasciola hepatica*. Animals infested with young forms of *F. hepatica* or with *Dicrocoelium lanceolatum* are not completely freed even by several double doses at intervals of about a week.—Miller Watson.

Ranson, T. Y. (1943). **Intra-peritoneal Medication with Sulphanilamide.**—*Vet. Rec.* **55.** 131. **2015**

R. describes the successful use of sulphanilamide intraperitoneally in cows in the treatment of post-parturient metritis, especially following retention of the placenta, in which condition it is suggested that peritonitis is a frequent cause of death; in R.'s experience oral treatment with sulphanilamide has not given good results. Three case histories are given including one of metritis following hydrops amnii. A very small incision is made in the right flank under local anaesthesia, and 2 oz. of sulphanilamide in one pint of water introduced by trocar and cannula.—M. H. Weddell.

Reineke, E. P., & Turner, C. W. (1943). **Synthetic Thyroprotein, a New Drug Available in Veterinary Practice.**—*J. Amer. vet. med. Ass.* **102.** 105–108. **2016**

The authors review recent work which they have carried out on the synthesis, by the iodination process, of thyroprotein from protein (casein) of non-thyroid origin. This artificial thyroprotein can now be manufactured relatively cheaply and is at least four times more potent than natural thyroid powder. The possible application of synthetic thyroprotein to the treatment of thyroid deficiencies in domestic animals is discussed. In normal experimental animals it has been shown that when fed in very small amounts, thyroprotein will increase growth rate by as much as 25%, and the authors suggest that the feeding of thyroprotein to domestic animals may be an effective method of speeding up rate

of growth in fattening animals and sexual maturity in breeding animals. Discussing infertility, the authors suggest that in some cases, particularly in the fat type of cattle, sheep, and pigs, and in old animals, the cause may be a slight hypothyroidism. By therapy with thyroprotein the metabolic condition and the normal sexual functions of such animals might be restored. The authors emphasize that considerable research will be required to establish the proper role of thyroid therapy in farm animals and that extensive experimental work will be necessary to establish proper dosage levels. —N. J. Scorgie.

*Johansen, K. R. (1942). Physexbehandling av Minke (Nertz). [**Physex (Gonadotropic Hormone) Therapy in Minks**].—*Medlemsbl. danske Dyrlaegeforen.* p. 122. [Abst. from abst. in *Skand. VetTidskr.* **32.** 588]. **2017**

Minks mate between the beginning of March and middle of April and the gestation period is 42–62 days. On a small mink farm no young were born in 1940 or 1941 in spite of apparently normal mating, so one male and eight females were injected with 80, 125, or 250 units of " physex ". The male mated with three females, one of which bore young and another treated female mated with an untreated male and bore young.

Experience from these cases suggests that a dose of at least 250 units is indicated for minks.

Allen, G. S. (1943). **Some Observations on Stilboestrol Dipropionate in the Treatment of Anoestrus.** —*Vet. Rec.* **55.** 168–169. **2018**

Eighteen maiden heifers and 12 cows were treated for anoestrus by the injection of 10–20 mg. of stilboestrol, the actual dosage depending on the size of the animal. Treatment was apparently successful in eight heifers and 11 cows, which showed occurrence of oestrus within 2–8 days and the re-establishment of a normal ovarian cycle. From these results, A. concludes that stilboestrol is more likely to be successful in the treatment of anoestrus in cows than in heifers. He considers that the dosage of stilboestrol usually recommended [see *V. B.* **12.** 432.] is too high, such doses tending to cause very pronounced sexual excitement.—N. J. Scorgie.

Weighton, C. (1943). **Stilboestrol Dipropionate for the Removal of a Mummified Foetus.**—*Vet. J.* **99.** 125–126. **2019**

Injection of 20 mg. of stilboestrol, followed the next day by 15 mg., induced in 48 hours from the first injection sufficient dilation of the cervical canal in a cow to permit the removal of a five-month foetus with the aid of forceps.—N. J. Scorgie.

Robertson, O. H., Puck, T. T., Lemon, H. F., & Loosli, C. G. (1943). **The Lethal Effect of Triethylene Glycol Vapor on Air-Borne Bacteria and Influenza Virus.**—*Science.* **97.** 142–144. **2020**

Preliminary tests have shown that triethylene glycol is one of the least toxic of the glycols for man or animals.

Micro-organisms suspended in fresh saliva were atomized in a small experimental room in such numbers that hundreds to thousands of colonies developed on blood-agar plates exposed on the floor for periods of 10 min. The vaporization of 1 g. of triethylene glycol in 200 million c.c. of air caused the almost immediate disappearance of streptococci or pneumococci. The same concentration of triethylene glycol protected mice completely against a concentration of influenza virus which caused the death of all control mice exposed 10 min. before.—John Francis.

Browning, C. H. (1943). **The Present Status of Aminoacridine Compounds (Flavines) as Surface Antiseptics.**—*Brit. med. J.* March 20th. 341–343. **2021**

Aminoacridine compounds were introduced as surface antiseptic agents for wounds because they combined outstanding antiseptic properties with relatively low toxicities to tissues and to the natural defences of the body. Proflavine is cheaper and less toxic than acriflavine and is, at present, the acridine derivative of choice. Newer compounds (2 : 7-diamino-acridine and 5-amino acridine) require further investigation. Under experimental conditions the acridines, when applied to the tissues at a site of inoculation, are effective in preventing the development of infection with various organisms, including streptococci and certain gas-gangrene anaerobes. There is also clinical evidence that proflavine powder, applied in strictly limited amounts, can control established suppuration in wounds. Retardation of granulation and healing tends to follow continued use of the acridines, so that it may be advantageous to resort to other treatment later.—J. M. Robson.

See also absts. **1848** (treatment of epizootic lymphangitis), **1854** (of trichomoniasis), **1962** (vitamin prophylaxis), **1974**, **1975** (sulphonamides and nutrition), **1991** (anthelmintics).

HYGIENE AND PUBLIC HEALTH

Ahrens, W. (1942). Eine Fleischvergiftungsepidemie durch Salmonella typhi murium. [**An Outbreak of Meat Poisoning due to *S. typhi-murium* Infection**].—*Arch. Hyg., Berl.* **128.** 208–215. **2022**

Description of an outbreak affecting 241 persons who had eaten infected sausage. The infection was traced provisionally to a heifer which was slaughtered on account of ill health.—J. E.

See also absts, **1821** (TB. in slaughter animals), **1903** (trichinosis), **1902** (viability of cysticerci).

TECHNIQUE AND APPARATUS

Oliver, J., & Reusser, T. R. (1942). **Rapid Method for the Concentration of Tubercle Bacilli.**—*Amer. Rev. Tuberc.* **45.** 450–452. [Spanish summary]. **2023**

A description of a concentration method in which " clorox ", a bleaching solution, of which the active ingredient is sodium hypochlorite, is used. Body fluids are mixed well with the solution, and allowed to stand for 10 min., after which the mixture is centrifuged, and films are prepared from the sediment. The latter consists almost entirely of tubercle bacilli, as other organisms, pus, blood and mucus are completely digested. The authors claim that the technique is superior to any previously described method in accuracy, rapidity, and safety. They give results of comparative examinations of 300 sputa in which " clorox ", sodium hydroxide, chemical flocculation, papain, and direct smear methods were used.—Isobel W. Burton.

Corper, H. J., & Cohn, M. L. (1942). **Media for Tubercle Bacilli. An Evaluation of Different Media for Diagnostic Cultures of Tubercle Bacilli.**—*Amer. Rev. Tuberc.* **46.** 560–567. [Spanish summary]. **2024**

The authors deplore the use of multiple component nutrients for the cultivation of tubercle bacilli. Such media are generally unreliable for diagnosis and are otherwise undesirable. Comparative tests are described

which show that a simple egg-yolk medium is equal in efficiency to all known multiple component media for growing small numbers of tubercle bacilli.—D. D. O.

McCarter, J. R., & Kanne, E. M. (1942). **Egg Mediums for the Isolation of all Three Types of Tubercle Bacilli.**—*J. infect. Dis.* **71.** 102–105. 2025

Egg-yolk media without glycerin were found to support the growth of even small inocula of all three types of tubercle bacilli; if the same medium with glycerin was also used, growth only on the non-glycerated medium was presumptive evidence that the organism was of the bovine type. The method of preparing egg-yolk media for best results is described, autoclaving at 120°C. for 30 min. being preferred to the commoner method of inspissating.—E. Cotchin.

Pottenger, J. E. (1942). **Controlled Staining of Mycobacterium tuberculosis.**—*Amer. Rev. Tuberc.* **45.** 549–557. [Spanish summary]. 2026

A known positive control smear is placed in the corner of each slide, and stained simultaneously with the unknown, as follows :– stain for 15 min. on top of a closed water-bath at 65°C. with strong carbol fuchsin, cool 2–3 min., treat with 3% HCl 30 sec., wash with 70% alcohol 10 sec., and then complete decolorization with fresh 5% sodium sulphite, alternating with 70% alcohol if necessary, counterstain with one-third saturated picric acid 10 sec. 30 single organisms in the thinnest part of the control smears are counted and classified as deeply stained, well stained, or poorly stained; the film is restained if less than 21 are deeply stained or more than three poorly stained. The chance of contamination from the control smear is remote. In experiments, of a total of 70 specimens containing a few organisms, only 48 were positive by light staining, while all were positive by deep staining as outlined. —E. Cotchin.

Pottenger, J. E. (1942). **Present Practice in Staining Mycobacterium Tuberculosis in Representative Institutions.**—*Amer. Rev. Tuberc.* **45.** 568–575. [Spanish summary]. 2027

A survey of methods of staining for tubercle bacilli in 21 institutions, and of an examination of 137 specimen stained smears therefrom, with a discussion of the varying methods and results. The original must be consulted for details. No general conclusion was drawn. —E. Cotchin.

Burnet, F. M., & Faris, D. D. (1942). **The Technique of Quantitative Chorioallantoic Virus Titration.**—*J. Bact.* **44.** 241–248. [Authors' summary slightly amended]. 2028

The technique of quantitative virus titration of the chorioallantois has been modified to avoid as far as possible the nonspecific lesions produced by haemorrhage when the chorioallantois is separated. A drop of sterile saline is used as a fluid wedge to facilitate this separation. A number of other technical points in the processes of inoculating, removing, and counting lesions on the membranes are discussed.

Pickels, E. G. (1942). **Apparatus for Rapid, Sterile Removal of Chick Embryos from Eggs.**—*Proc. Soc. exp. Biol., N.Y.* **50.** 224–228. 2029

P. gives a detailed description of the apparatus, which consists mainly of metal trays each containing four egg-holders. These trays move across a special stand which causes the egg-holders to revolve at a variable speed (45 rev. per min. is recommended). A special oxyacetylene torch is used for sterilizing the egg-shell in the region of the air sac. P. states that in this way an operator can handle 1,000–1,200 eggs per hour.

The article is illustrated with photographs.—A. B.

Rees, C. W. (1942). **The Construction of a Micro-manipulator for the Isolation of Protozoa.**—*Amer. J. trop. Med.* **22.** 487–492. 2030

R. has already published a description of a micro-manipulator [see *V. B.* **8.** 422 (II)] which he designed for selecting individual protozoa from a mixed preparation of bacteria and protozoa, for transferring protozoa to sterile fluid, and for seeding isolated protozoa into tubes of sterile culture medium. He publishes this further account because his earlier paper was inadequately illustrated and because several modifications have been made since the last paper appeared. In one experimental series, 80% of the isolations resulted in positive cultures of *Entomoeba histolytica*, a result which gives some indication of the efficiency of the apparatus. [The description is clear and although the figures give the impression that an expensive piece of apparatus is being described, R. assures the reader that the cost of it is small.]—C. Horton Smith.

Metcalf, F. L., & Stahl, W. E. (1942). **Development and Management of a Blood Bank.**—*J. Amer. vet. med. Ass.* **101.** 265–271. 2031

The authors describe their technique of obtaining, storing, and administering whole blood and plasma from and to animals, dogs, horses, and cattle being mentioned. Whole blood is drawn into bottles containing a buffered dextrose plus citrate solution in the proportion of 3 : 2 of preservative : blood. Plasma is obtained from stored citrated blood by drawing it off by vacuum pressure *via* a gauze filter. Both blood and plasma are stored at 5°C. and are injected without preliminary warming.

Dog blood has been stored successfully (without haemolysis) for 40 days and horse and ox blood for 120 days. Indications for blood or plasma therapy are briefly reviewed.—J. E.

Knowles, R. H. (1942). **The Rational Clipping of Army Horses and Mules.**—*J. R. Army vet. Cps.* **13.** 78–82. 2032

K. discusses in detail the procedures for clipping army horses of field units and suggests that one of the most satisfactory methods is "top clipping". This involves the removal of the coat from the upper surface of the body, leaving the coat unclipped on the lower part and on the legs. The clipped part is above a line drawn from about 6 in. behind the poll downwards and backwards to the centre of the neck, continuing across the shoulder to a point half-way down the ribs and then backwards to a point a few inches below the point of the buttock. It is claimed that the method is an efficient control of parasitic skin diseases, where in the great majority of cases the primary lesions are confined to the area over which the coat is removed by "top clipping". —N. J. Scorgie.

*Ilieff, T. (1941). **[Identification of Domestic Animals by the Nasolabiogram].**—*Yearb. vet. med. Fac. Sofia.* **17.** 83–176. [In Bulgarian]. [Abst. from abst. in *Jber. Vet.-Med.* **69.** 529]. 2033

The preparation of a nasolabiogram—an impression of the skin of the muzzle prepared by a method resembling that used by the police for registering fingerprints—is valuable for the identification of dogs, cattle, and buffaloes. It is not practicable for horses, pigs, and cats owing to the limited space of the planum nasale and the flatness of ridges of the furrows, which renders the preparation of the nasolabiogram difficult in these animals.—A. Moldawsky.

See also absts. **1816** (diagnosis of mastitis), **1831** (tuberculin test in primates), **1835** (cultivation of tubercle bacilli), **1847** (of *Vibrio foetus*), **1889** (toxin titration), **1862** (isolation of leptospira), **1867** (virus conservation), **1931** (tissue culture of neoplasma), **1868** (hide sterilization), **1817** (udder biopsy), **1982** (cerebrospinal fluid pressure determination).

MISCELLANEOUS

MOHLER, J. R. (1942). **Veterinary Resources as Aids to Victory.**—*J. Amer. vet. med. Ass.* **101.** 377–382. **2034**

M. refers to the resources of the profession which are available for war services. He proposes a seven-point programme, to ensure that large supplies of sound, wholesome livestock products shall be available to the nation.—H. V. HUGHES.

LACHENSCHMID, M. (1942). Das neue Staatliche Veterinär-Untersuchungsamt in Bromberg. **[The New State Veterinary Investigation Office at Bromberg].**—*Tierärztl. Rdsch.* **48.** 291–294. **2035**

A description of the adaptation of a private house into a veterinary investigation office to serve the government district of Bromberg, which is part of the new Gau of Danzig and West Prussia.—J. E.

HAGAN, W. A. (1941). **An Outline of Lectures on Pathogenic Bacteriology and Immunity with Relation to the Domestic Animals.** pp. xi+149. Ann Arbor, Mich.: Edwards Brothers, Inc. [4to] [Out of print]. **2036**

This book comprises Professor HAGAN'S lecture course for students at New York State veterinary college. It deals with protozoa and filtrable viruses as well as with immunity and bacteriology.

FURTH, J. (1942). **The Teaching of Experimental Pathology.**—*Arch. Path.* **34.** 75–91. **2037**

F. reviews the teaching of experimental pathology in medical schools in Europe and the U.S.A. The course as now carried out at Cornell University Medical College, where it was introduced in 1932, is very comprehensive and consists of experiments made by the students and in many cases published by them, under the supervision of instructors. The relevant literature is read and discussed and the experimental results are written up and read to the class. The subjects investigated include the pathology of inflammation, encephalomyelitis in mice, transplantation and regeneration of tissues, histochemical reactions, experimental TB., tissue culture, tumours produced by carcinogenic agents and viruses, experimental leucaemia, vitamin deficiencies, relation of hypersensitivity to immunity, and many others.

Such a course is complementary to the regular teaching course in pathology and should form part of the curriculum.

"Experimental pathology discloses to students the dynamic quality of pathologic events, makes them aware of action and reaction within the diseased body, sharpens their reasoning, provides them through actual experience with the ability to evaluate lectures, readings and observations, and shows them how to formulate and test working hypotheses of their own".

—E. G. WHITE.

—. (1941). **Biology of the Laboratory Mouse.** [Edited by SNELL, G. D.] pp. ix + 497. Philadelphia: Blakiston Company. [8vo] **2038**

This book is a collection of articles by nine authors on laboratory mice, and deals with their embryology, reproduction, histology, spontaneous neoplasms, gene and chromosome mutations, the genetics of spontaneous tumour formation, genetics of tumour transplantation, endocrine secretion and tumour formation, milk influence on tumour formation, inbred and hybrid animals and their value in research, parasites and infectious diseases. The care of laboratory mice is dealt with, as well as the maintenance of records.—J. E.

REPORTS

UNION OF SOUTH AFRICA. CITY OF JOHANNESBURG. (1942). **Report of Director of Abattoir and Live Stock Market Department for the Period 1st July, 1940, to 30th June, 1941.** [KIRKPATRICK, A. C.] pp. 19. Johannesburg: Radford, Adlington, Ltd. [fcp]. **2039**

The staff consisted of 182 European and 180 African employees. 1,761,415 animals passed through the markets and 1,073,185 were slaughtered in the abattoir. Meat and offal condemned weighed 948 tons. The main causes of condemnation were bruising, abscesses, SARCOSPORIDIOSIS, CYSTICERCOSIS, ECHINOCOCCOSIS, and TUBERCULOSIS. Altogether 143 cattle and 320 pigs were found infected with TB. In the veterinary examination of 10,148 dairy cows there were 25 cases of T.B., 585 of MASTITIS, 162 of METRITIS, and 229 of MANGE, while 120 were suffering from "poverty". The death rate among equine animals maintained by the municipal council was 6·9%. 517 of the total of 1,733 received veterinary treatment. Among animals at the zoo, PNEUMONIA was the most common disease. There was no outbreak of epizootic disease.—J. A. G.

MAURITIUS. (1942). **[Report of] Veterinary Division [1941].** [LIONNET, F. E.]—*Rep. Dep. Agric. Mauritius, 1941.* pp. 28–29. **2040**

Positive tuberculin test reactions occurred in 249 (30%) of 827 cattle. Three out of 8,625 blood smears showed trypanosomes (two *T. evansi* and one *T. vivax*, from cattle). There were some cases of PIROPLASMOSIS in cattle.—J. E.

BOOK REVIEWS

—. (1942). **Keeping Livestock Healthy. United States Department of Agriculture, Yearbook of Agriculture 1942.** pp. xiii+1276. Washington, D.C.: Superintendent of Documents. [8vo] [$1.75]. **2041**

This volume is the seventh in the series of *Yearbooks* intended to supply agriculturalists with an up-to-date survey of various branches of science covered by the United States Department of Agriculture. The current *Yearbook*, like that of 1939 [*Food and Life*—*V. B.* **11.** 909.] is of great veterinary importance, and its many references render it a most valuable current epitome on a very wide range of animal disease subjects.

The book proper is divided into nine parts, of which the first (126 pp.) is entitled "Fundamentals of Disease and Insect Control", and deals with economics, bacteriology, immunity, endocrinology, genetics, artificial insemination, disinfection, entomology, and the legal aspects of disease control. The remaining parts deal with specific and nonspecific diseases of animals. [In what follows the sign (*) indicates that the chapter in question contains a list of references and may therefore be of special value to those tracing original literature.]

Part 2 (136 pp.) deals with diseases common to several species. The chapter entitled "Tuberculosis and its Eradication" mentions the susceptibility of livestock and refers to the successful control of bovine TB. "Anthrax" (*) is well written; herd vaccination well in advance of the danger season is advocated. Other chapters in this section deal with "Foot-and-Mouth Disease", "Parasites and Insects Affecting Livestock", "Bacterial Infections and Parasites Common to Man and Animals", "The Screwworm and Blowfly Problem", "Nutritional Diseases of Farm

Animals" (*) and "Plants Poisonous to Livestock". The seriousness of poisoning with locoweed (*Astragalus* and *Oxytropis* spp.) is referred to.

Part 3 (125 pp.), concerning horse and mule diseases, contains much up-to-date information not readily found elsewhere. The chapters include "Equine Encephalomyelitis" (*), "Equine Infectious Anemia or Swamp Fever" (*), "Periodic Ophthalmia of Horses", "Glanders", "Dourine", and "Miscellaneous Diseases of Equines", the last dealing with influenza, strangles, purpura haemorrhagica, wounds and wound infections, breeding troubles, diseases of the newborn, lameness, bone diseases, foot ailments, skin diseases, abnormalities of the teeth, fistulous withers and poll evil, and "azoturia" [equine myohaemoglobinuria]. Other chapters deal with internal parasites, mange (*), horse bots (*), and some insect pests (*). The parasitological sections of this and other parts have a practical bias.

Part 4 (172 pp.) describes the diseases and parasites of cattle. In the chapter on "Brucellosis of Cattle", control by the removal from herds of reactors to serological tests, and control by calfhood vaccination are discussed, and the progress made in the U.S.A. by the use of these measures is described. Johne's disease is thought to be on the increase. Bovine mastitis is discussed. Blackleg is briefly described, and in the chapter on "Shipping Fever, or Haemorrhagic Septicaemia" it is maintained that the prevalent disease which is precipitated by transit is the commonest form of haemorrhagic septicaemia, that the primary infective agent is unknown, but is probably a filtrable virus, *Pasteurella septica* possibly being a secondary invader. Milk fever (*) is discussed and a chapter on "Miscellaneous Diseases of Cattle" (*) deals with calf scours, tumours, actinobacillosis and actinomycosis, nasal granuloma (the aetiology of which in the U.S.A. has not been established), specific ophthalmia, calf diphtheria, pneumonia and choke, cattle coccidiosis (*), cattle tick fever, anaplasmosis (*), cattle scab, tapeworm and roundworm parasites (*), bovine genital trichomoniasis (*), cattle grubs or heel flies [=warbles] (*), the stablefly (*), the horn fly (*), and cattle lice (*). Further chapters deal with injuries caused by ingestion of foreign objects, lead poisoning (*), and nutritional diseases (*).

Part 5 (154 pp.) deals with pig diseases. "Hog Cholera" contains a section on P.M. findings which merits special study; crystal-violet vaccine is considered to have application even where the serum-virus method is permitted. Swine erysipelas (*) is so far less serious than in Europe, but is not decreasing. "Enteritis in Swine" (*) deals with necrotic enteritis, swine dysentery, and enteritis of young pigs. The relation of nutrition, especially of nicotinic acid deficiency, to *Salmonella cholerae-suis* infection is discussed and it is pointed out that the evidence does not appear to be sufficient to rely on adequate nutrition alone to control the disease. Swine influenza (*) is described. A chapter on "Miscellaneous diseases of Swine" refers to swine pox (*), infectious arthritis, necrotic stomatitis and rhinitis, paralysis of the hindquarters, pneumonia, mastitis, skin diseases, and swine plague. The independent existence of the last-named disease under American conditions is not yet established with certainty. Mange (*), hog lice (*), internal parasites (*), and trichinosis (*) are dealt with in detail. "Salt Tolerance and Salt Poisoning of Swine" (*) contains a review of the literature and an account of some hitherto unpublished experiments carried out at Beltsville. Nutritional diseases (*) are well summarized by MADSEN.

Part 6 (100 pp.) is devoted to the diseases of sheep and goats and contains chapters on "Foot Rot of Sheep" (*), "Sore Mouth of Sheep and Goats" (*), "Miscellaneous Diseases of Sheep and Goats" (*), "Internal Parasites of Sheep and Goats" (*), "Sheep Scab and Its Control", "Sheep Ticks" [= sheep ked], "Goat Lice", "Pregnancy Disease of Sheep" (*), and "Lunger Disease of Sheep" (*); the last appears to correspond to jaagziekte. The chapter dealing with miscellaneous diseases discusses bloat, enterotoxaemia, various respiratory diseases, listerellosis, abortion, mastitis, infectious keratitis, arthritis, black disease, caseous lymphadenitis, Johne's disease, stiff-lamb disease, and wool or dirt eating. It is pointed out that prevention of pregnancy disease by good husbandry is more successful than treatment. The chapters on parasitology are excellently written and up-to-date.

Part 7 (176 pp.) deals most comprehensively with poultry diseases and indicates the vast amount of research devoted to these species in the U.S.A. The control of pullorum disease (*) is now being tackled on a Federal basis. Fowl paralysis and other forms of the avian leucosis complex (*) are discussed at some length, but it is stated that the cause of the disease is not definitely known although most authorities believe that a filtrable virus is the infective agent. The part entitled "Respiratory Diseases of Chickens and Turkeys" (*) discusses infectious laryngotracheitis, infection coryza, other forms of coryza, and sinusitis in turkeys. Other problems dealt with are fowl pox, psittacosis (*), miscellaneous diseases, paratyphoid, fowl typhoid, fowl cholera, mycoses of various types, epidemic tremor or infectious avian encephalomyelitis, avian TB., poisoning and lameness, internal parasites (*), coccidiosis of the chicken (*), poultry lice (*), poultry mites (*), the fowl tick, bedbugs (*), the pigeon fly [*Pseudolynchia canariensis* = *P. maura*], and nutritional diseases of poultry (*).

Part 8 (107 pp.) deals with some diseases of dogs and cats, including rabies, distemper of dogs (*), and feline enteritis (*).

Part 9 (21 pp.) is entitled "Wildlife Diseases and Parasites", and opens with a chapter on "Diseases of Wildlife and Their Relationship to Domestic Livestock" (*) which is essentially of North American interest. There follows a chapter on "Diseases of Fur Animals" (*).

Because of the excellent review given of most of the known diseases of animals this volume should be in the hands of every practising veterinarian, and it is to be hoped that copies will be made readily available on sale to readers outside the U.S.A.—A. N. WORDEN.

BRAGA, A. (1942). Soros, vacinas, alérgenos e imunígenos. Tomo III. **[Sera, Vaccines, Allergens, and Immunogens. Vol. III]**. pp. 246. 36 figs., numerous tables. Rio de Janeiro: Imprensa Nacional. [8vo]. [For volume II, see *V.B.* **12**. 520]. **2042**

In this volume, Braga deals with the standardization of immune sera against *Clostridium chauvoei, Cl. septicum, Cl. novyi, Cl. welchii*, and mixed clostridium infections. Standardization of canine distemper antisera is also discussed. Methods are described in great detail. An interesting chapter is that on the testing of glass for use in the manufacture of receptacles for biological preparations.

The volume, like volume II, is illustrated and deals with the various subjects in a most complete manner. The book should be of great use to laboratory workers not only in Brazil, Portugal, and Portuguese colonies, but also throughout Central and South America. Those in other countries would find much of interest, with regard to the practice of Brazilian workers.—M. W.

See also absts. **2036** (bacteriology and immunity), **2038** (biology of laboratory mouse).

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